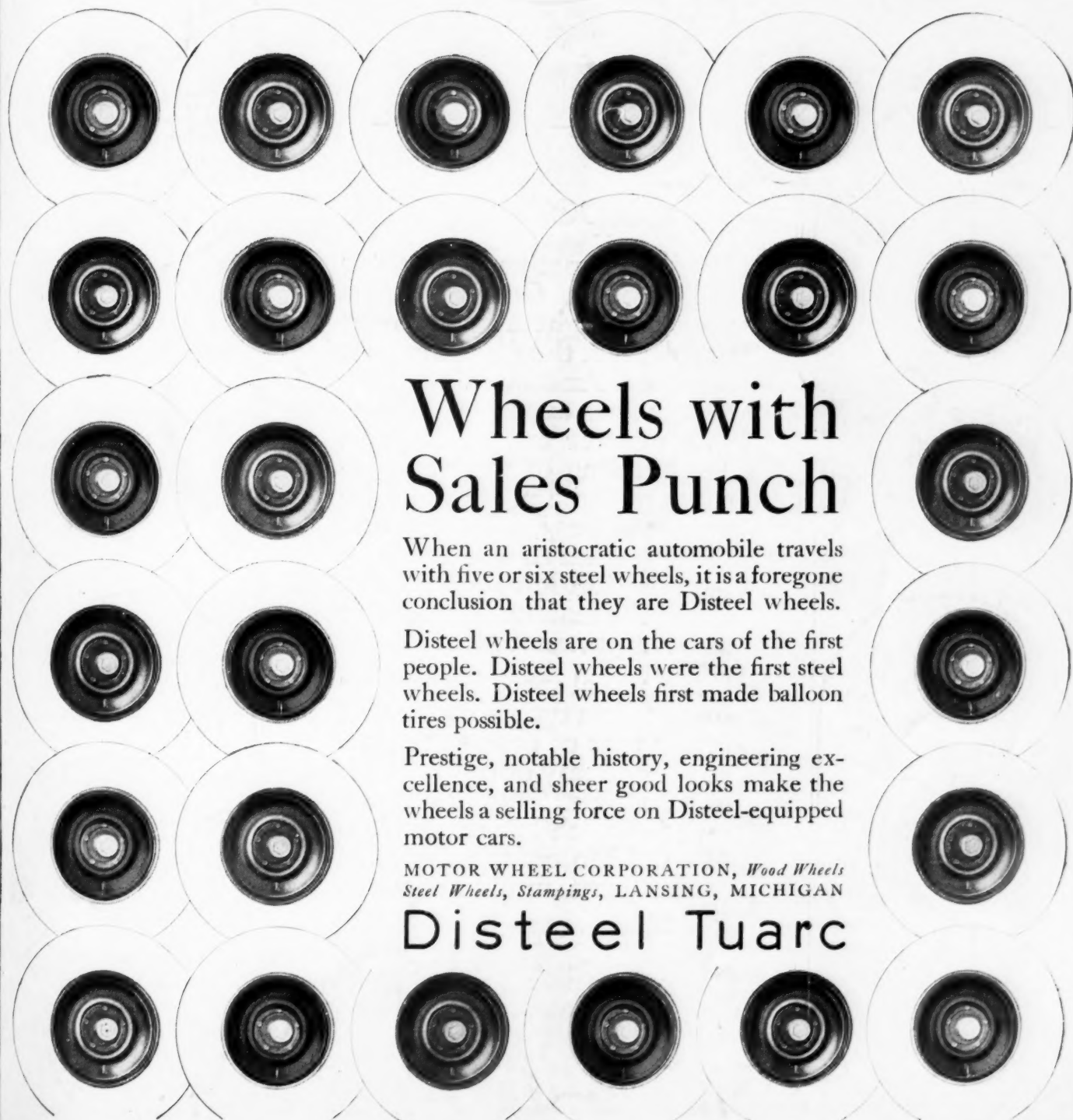


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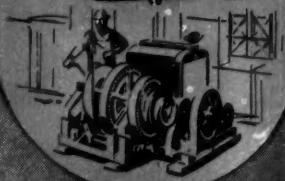
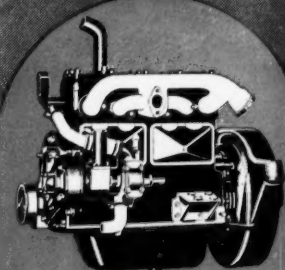
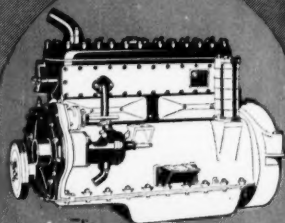
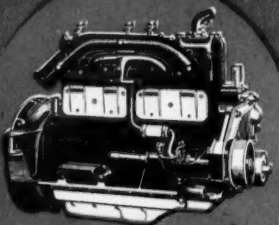
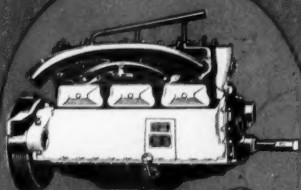
Continental specialization has resulted in a type of motor that gives years of constant usage. And economy of operation is another outstanding characteristic which has made Continental Motors the choice of such a great number of users.

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AUTOMOTIVE INDUSTRIES

VOLUME 54

Philadelphia, Thursday, February 25, 1926

NUMBER 8

82% of Motor Buses Sold Through Dealers and Branches

Only 18% of 1925 output went direct from factory to user. Traction companies operate only 8% of buses in use. New problems arise.

By Norman G. Shidle



BUS distributing methods, while still in the formative stage, very clearly are following along channels similar to those which have been successful in getting other automotive products into the hands of ultimate users.

A far larger proportion of buses are being distributed through branch and dealer channels than has been generally recognized in the industry, even by those manufacturers who themselves are producing motor buses. Confidential reports just received from 28 leading bus makers regarding marketing practices, coupled with analysis of current statistical data on buses, indicate that:

1. Eighty-two per cent of all the buses manufactured in 1925 were sold through dealers and branch houses. Only 18 per cent were sold by factories direct to the user.

2—Bus makers, with one or two notable exceptions, are selling an overwhelming proportion of their output to independent operators. Less than 8 per cent of all the buses now in operation are being used by the traction companies.

This means that bus dealers and branches last year sold in the neighborhood of 14,350 motor buses and that factory-to-user sales totaled something like

3,150. Figures are not yet available to show the further division of sales between branches and dealers.

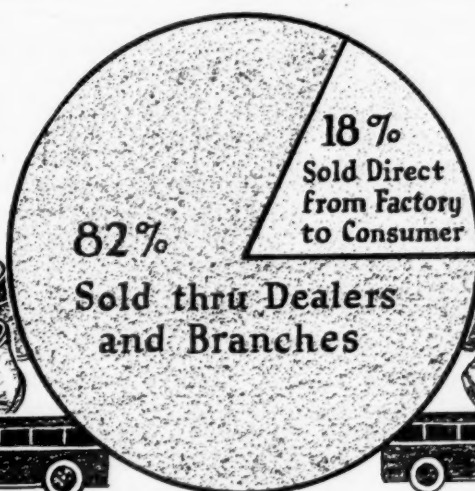
A few important bus makers do contact directly with their customers on a good many sales, but a far larger number distribute from 80 to 100 per cent of their entire output through dealers and branches. This latter group includes two of the three largest bus builders in the country.

As a matter of fact, if returns from these representative concerns may be considered typical for the entire bus industry (and it is reasonable to assume that they may be), only 21 per cent of the companies making buses are confining their efforts exclusively to direct factory-to-user distribution as against 50 per cent which are merchandising exclusively through dealer and branch channels. The other 29 per cent of bus builders are utilizing both methods of marketing.

Put in another way, the figures indicate that 79 per cent of all bus manufacturers are using dealer and branch distribution either exclusively or in combination with some factory-to-user selling.

The bus builders who also have a widespread passenger car business are, as might be expected, selling very largely through their regular retail and wholesale organization, factory-to-user sales being negligible or

1925 Bus Sales



entirely lacking in practically every one of these cases.

Companies with truck retail organizations also are selling chiefly through branches and dealers. At least eight bus manufacturers who do not make passenger cars are marketing their buses 100 per cent through dealers and branches, while one other prominent bus company in this same category sells 95 per cent of its output through dealers and branches and only 5 per cent direct to users. Included in this latter group are several prominent firms which do a very substantial part of the total traction company business.

The bus manufacturer seems destined to have the same problems of building a retail and wholesale organization and keeping that organization active in merchandising his product as the passenger car and truck makers have had before him. There is nothing to indicate in the present trend of bus marketing methods that any very considerable proportion of total bus production is going to be distributed through channels other than those previously used in the car and truck field; this despite the recognized fact that sales methods and necessities in the bus field are specialized in many respects.

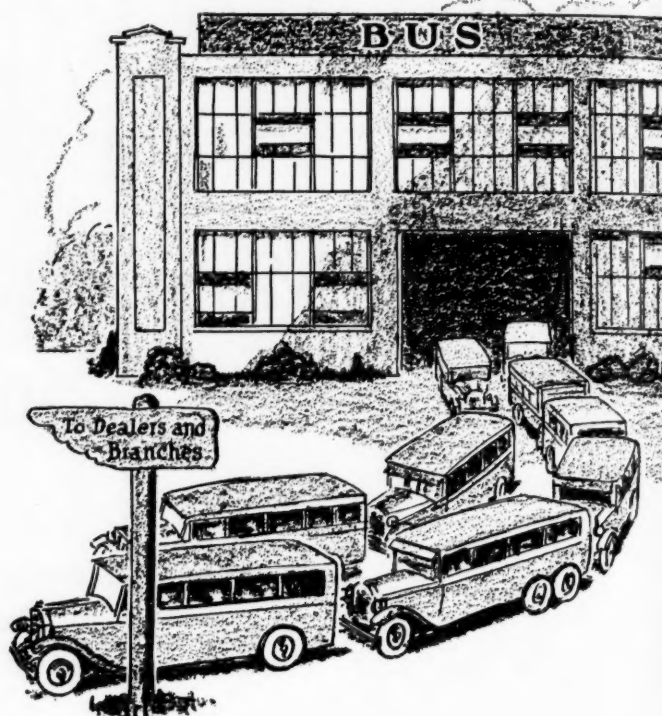
Methods Vary

These facts, based as they are on analysis of practices actually used in distributing the 17,500 motor buses built in this country last year, tend to throw new light on the whole question of bus marketing. Because certain outstanding companies have been particularly successful with the direct factory-to-owner method of marketing buses, a general feeling has existed that this was the predominating method in vogue; that dealers and even branches were used only to a limited extent. Analysis shows, however, that only about 18 per cent of the 1925 bus production was sold direct to the users. It shows also that among the companies using the dealer and branch method of selling are organizations which equal or surpass in production those in the former group. This point is emphasized, not as a judgment of the relative merits of the methods, but simply to bring out clearly the difference between the facts as revealed by the survey and a rather widespread existing impression.

Obviously, however, numerous distribution outlets are necessary if buses are to be sold to relatively small operators at widely separated points throughout the country. And there is strong evidence, even in this early stage of bus development, that a considerable proportion of the future of bus sales lies outside the metropolitan areas, just as the largest market for cars and trucks has been developed in the towns and cities of less than 25,000 population.

The extent to which this trend already has been evidenced in the bus field is shown both by the fact that over 90 per cent of the buses now in operation have been sold to independent operators and the additional fact that a

How 1925 Motor Bus



majority of these operators are functioning in connection with smaller towns rather than big cities.

A large majority of bus manufacturers already are concentrating their efforts on building up numerous contacts with independent operators; seeking sales to more operators with fewer sales per operator, rather than concentrating all of their sales guns on the traction companies where unit sales, when made, are large. This tendency is indicated clearly by the fact that only 4 out of the 28 bus makers included in our survey sold more than 50 per cent of their 1925 output to traction companies. Of these four, only one ranks among the first five in production of buses.

Independent Buyers Predominate

On the other hand, 17 of these producers sold anywhere from 70 to 100 per cent of their 1925 output to independent bus operators. And included in this group are three of the leading builders of the heavier buses.

Further study of actual trends in bus marketing and of methods being applied successfully by various manufacturers is particularly desirable at this early period in bus development. When car and truck marketing was in the development stage, automotive executives had relatively little tendency to study trends nor to analyze figures. Necessity has brought about more analytical study in these fields. Had similar intensive study been given in earlier years many of the pitfalls might have been avoided which temporarily have hindered the industry's progress from time to time.

Bus marketing still is in its infancy. Automotive men today are in a mood to examine carefully developments as they take place, to correlate the results of current experiences and to predicate future policies on the basis of factual studies of past results.

Consequently, bus merchandising is likely to come in for intelligent analysis in its early stages. Wasteful practices are likely to be discovered soon after they creep in. General impressions should tend to give way before facts more quickly than before.

Distributing Buses

In 1925 bus production totaled 17,500.

Of this total, 14,350 buses were distributed through dealers and branches.

Only about 3,150 went to the user direct from the factory.

Production Was Sold



For every two buses sold direct from factory to operator, nine are sold through dealers and branches

The similarity in truck and bus marketing methods is reflected also in the close tie-up of both design and purchasing for the two types of vehicle in those factories where both are manufactured. Recent investigations indicate that in practically every factory, large or small, where both buses and trucks are built, the same engineers are working on design for both units and purchase of materials is being conducted through the same channels.

Traction Sales Increase

On the marketing side, it is significant that although a relatively small proportion of the buses have been or seem likely to be sold to the traction companies, these organizations are becoming better prospects for buses every year.

Not only are buses being used in increasing numbers by electric railways to supplement their existing facilities and to render service in places where establishment of new electric lines would be unprofitable, but also this new type of motor vehicle is supplanting existing electric lines in a number of instances. Several thousand miles of electric lines already have been abandoned in favor of buses in the

last few years and some further developments of similar character are to be expected in the future.

Replacement Market Growing

The replacement market is just beginning to be some importance in the bus field and will consume a larger part of total output in 1926 than ever before, although it is reasonable to expect that new business will constitute a major proportion of bus sales for many years to come. A good share of the replacement market at present probably consists of buses sold to operators who heretofore have been using simply truck chassis with bus bodies.

Manufacturers are likely to give considerable attention in the next few years to the question of educating bus salesmen, inasmuch as most companies feel that the average truck salesman is not well qualified to step into bus selling without considerable preparation. Bus marketing, in the opinion of some men who have studied the subject carefully in recent months, requires a special knowledge of passenger transportation problems. Since operating experiences are not always readily available for study and since many of the problems are new to the operator as well as to the salesman, it probably will be some time before any considerable literature on the subject of bus selling is developed. But as in the car and truck field, the education of the salesman is being recognized as one of the major problems of bus marketing before the manufacturers at this time.

Further Studies Needed

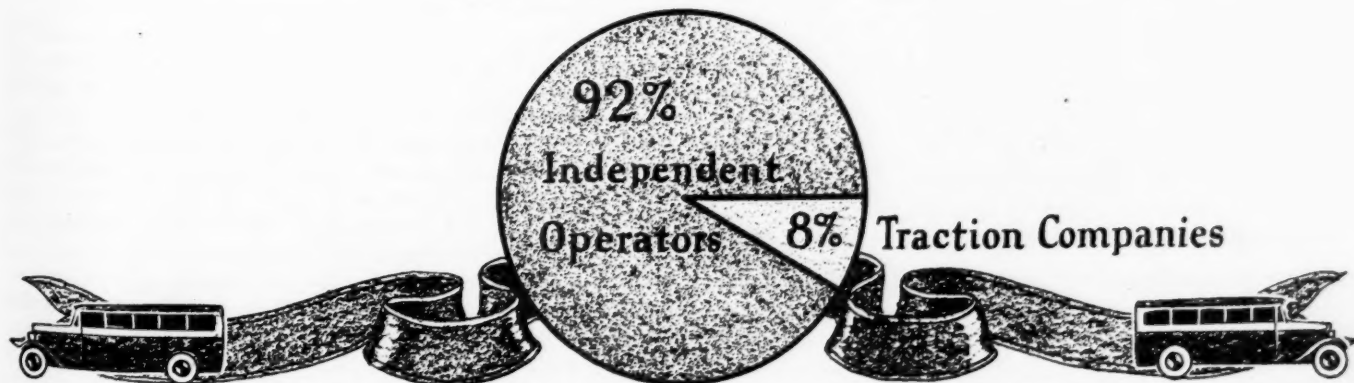
Only after a larger amount of accurate data has been compiled will it be possible to evaluate correctly the information already gathered. The current survey does seem to indicate clearly, however, that an overwhelming proportion of the buses built in the next few years will be sold through branch and dealer organizations, unless some drastic change in present method takes place. Such change is not likely, because economic necessities probably will demand a further extension and amplification of the present trend rather than any important detours.

Included in the useful statistical data already compiled regarding bus marketing, however, is the material concerning common carrier bus operation brought together by Edward F. Loomis, secretary, motor truck committee, National Automobile Chamber of Commerce.

This study shows, among other things, that common carrier bus operations now cover 232,340 miles of routes and include the use of 37,500 vehicles, while non-carrier bus operations account for 31,925 buses and 334,401 miles of route.

At the beginning of 1925, according to this survey, 34,100 buses were in use in common carrier operations and 18,825 in non-carrier bus operation.

Buses in Use



Positive Stone Adjustment a Feature of New Cylinder Grinder

Hutton finishing tool now used widely in production work. Six abrasive stones are held rigidly in position relative to each other, but head carrying them floats relative to driving head.

By Walter L. Carver

A TOOL for finishing cylinder bores which has graduated—as one might say—from the service into the production field and which has achieved a considerable degree of popularity in this latter field in a short time, is the Hutto grinder, manufactured by the

Hutto Engineering Co., Detroit, Mich. In the production field this tool was pioneered by the Continental Motors Corp., and it has since been adopted by such companies as Hupp, Hudson-Essex, Buick, Cadillac, Chrysler, Chevrolet and Franklin in this country and Daimler in England.

In the service field the Hutto grinder was introduced as a three-stone tool for use with a portable drill, but following the earlier experiments in production work it has been developed into a six-stone tool, which latter forms the subject of the following description. This improved tool is widely used also in the service field.

As shown in Figs. 1 and 2, six stones A are mounted on a liberally proportioned, hardened steel body B. For the usual operations on the cylinders of passenger car engines, these abrasive stones are 4 in. long and 7/16 in. wide. Each stone is mounted in a pressed steel carrier C, being secured by die-casting white metal in the space between the stone and the sides of the pressed steel member. Two ground pins D, D are riveted into the pressed steel carrier C, and their opposite ends are first turned cone-shaped and then beveled off to the same angle as the interior adjusting cones E, E. After the pins have been riveted in place, this beveled surface is ground to the desired dimension from the stone mounting surface.

Grinding the Pilot Holes

Pilot holes for the carrier pins C are ground to dimension and accurate location after the body B of the grinder has been hardened. As the stones are formed with care as to thickness and parallelism of the inner and outer surfaces, the working relationship of the cutting face of the stone and the bevel bearing surfaces at the inner ends of the pins are established within close commercial limits. The assembly of pins and pressed steel carrier is made in a fixture which insures parallelism and accurate spacing of the pins.

As each stone is assembled, it provides for a working wear of 1/8 in. Regardless of the size of the bore in which the grinder is to function, the cutting face of the stone has a radius of 1 3/8 in., when viewed from the end. This round form has supplanted the original flat face as the flat stones showed some tendency to chatter due to the high pressures developed at the corners. As illustrated, the stones are at all times drawn toward the center by the endless coiled springs F, F, which are hooked over the ends of all the pressed steel carriers.

The outstanding feature of this grinder head is the positive adjustment of the abrasive stones. The stones are advanced with no intermediate spring action which

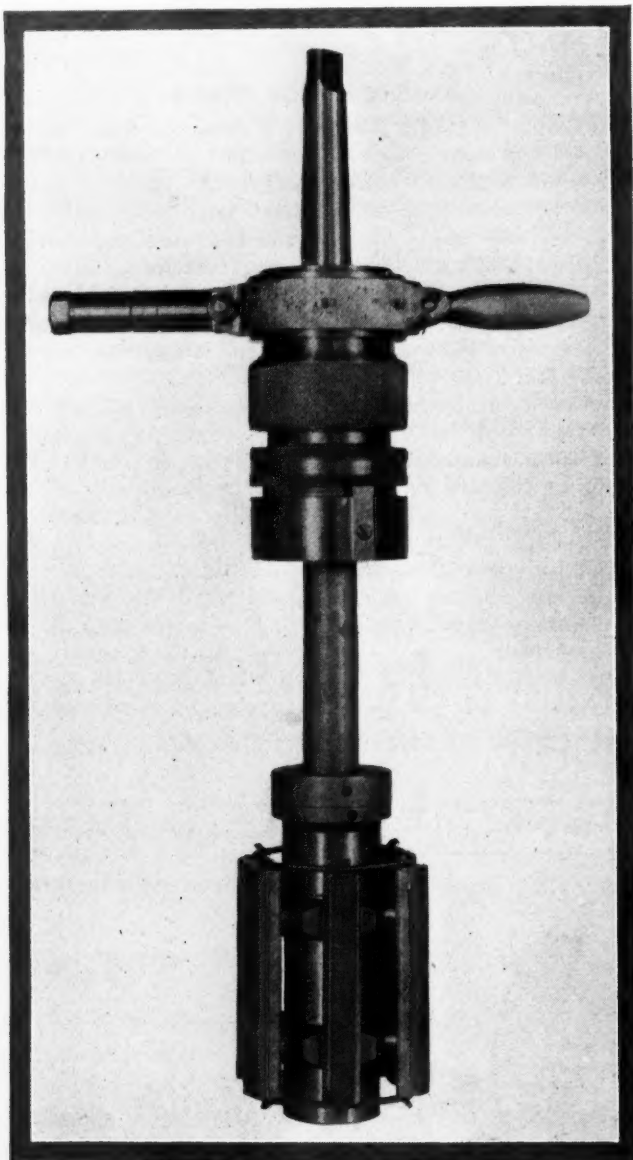


Fig. 1. Hutto grinder and friction type driving head. A floating bar enclosing a square adjusting shaft joins the two

Fig. 2. Internal details of both units of Hutto cylinder grinder, showing two floating cones and internal gear device which operates them

might tend to introduce bell mouthing at the end of the bore. As shown in the cross section, the beveled inner ends of the carrier pins D, D, bear on opposed cones E, E. Neither of these cones is fixed in the body of the grinder. A shank G of $\frac{1}{4}$ in. diameter passes through the upper cone and is threaded into the lower one, with a collar H at the back of the upper cone. This arrangement is similar to the double cone piston turning clutch which is used very largely in the industry. The lower cone is restrained from rotation in the body by means of two pins which engage in a slot as shown at the lower left.

With this arrangement a barrel type coil spring I separates the cones to the extent allowed by the screw adjustment described in the previous paragraph, but both cones float and are positioned by the reaction pressure developed at the carrier pins. The originator of this grinder regards this floating cone arrangement as the foundation of its success, as it allows for equalization of pressure and position of the abrasive stones and even corrects for differences in hardness at the opposite ends of the stones. In keeping with the character of the unit, the adjusting cones are hardened and ground.

In the usual production arrangement, the adjusting cones, or, rather, the shank or spindle on which they are mounted, is controlled by a square shaft J which passes up through the floating bar K which drives the grinder. The lower end of this square shaft J fits freely into a square socket in the collared head at the upper end of the adjusting spindle. The upper end of this square control shaft is fitted into one of the several adjusting means which are provided on the various forms of drivers. These will be discussed in a later portion of this article.

In operation, the adjusting cones are spread apart both before and after each operation. In other words, the grinder is introduced into the cylinder barrel before being set to a cutting position, and is contracted before being removed from the cylinder at the end of the grinding operation. In the usual practice, the cylinder block is set on a reciprocating table, while the grinder heads rotate in one plane. During the loading and unloading period the grinder heads are contracted and raised into pilot sleeves which are practically concentric with the cylinder bores, and the heads are returned to the working position within the cylinder bores before actual operation is started again.

Experience has demonstrated that the stones should

over-run the ends of the bores by $\frac{3}{4}$ to 1 in. and should completely over-run the middle point of the bore. That is the outer end of each stone should cross the horizontal center of the bore on each stroke. This point is highly essential to the production of straight bores of uniform size, and can be attained by varying either the length of stroke of the reciprocating table or the length of the grinder stones. However, in practically all cases involving passenger car engines of ordinary size, stones of 4 in. length will meet the situation.

Lack of Power a Handicap

One of the handicaps under which this grinder is being applied at present, the maker states, is the lack of power in existing equipment. For the cylinder of ordinary size, say 3 in. to $3\frac{1}{2}$ in. diameter, best results are obtained with about 350 r.p.m. of the grinder heads and 75 reciprocation strokes per min. It is stated that with these speeds a finish superior to that of the present will be obtained and the abrasive stones will wear about three times as long, with almost complete elimination of glazing.

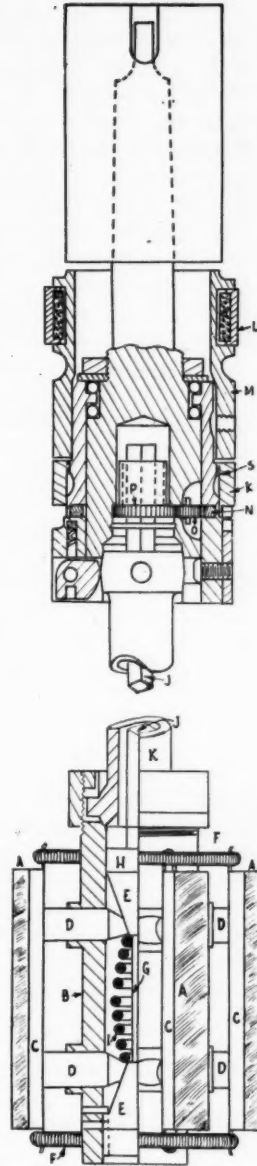
With abrasive stones of the correct grain and grit for iron of a given hardness, glazing can be charged to the slow speed of operation. This is a condition much like that of chip clearance. When the speed is too low the abraded material piles up on the stone instead of being cut free. Another good result of these speeds of rotation and reciprocation is a grinder pattern in which the intersecting lines cross at almost right angles in a diamond-shaped arrangement. The diagonals of these diamonds are in the vertical and horizontal planes and the vertical angles are slightly smaller than the horizontal.

In this connection the manufacturer states that the grinder marks should be discernible but not prominent, to insure the best commercial finish known as a satin finish. Recently one of the well-known companies had a lot of twenty cylinders put through with a mirror finish which can be produced with practically the same ease as the commercial finish. In about two weeks' time, this production department called back and cancelled any further mirror finish, as it was almost impossible to get the rings to wear in to a seal. The commercial or satin finish has been found to be one of the happy compromises which are so frequent in automotive production. At the end of the running-in period, the cylinder shows no wear but a good finish, with rings properly seated.

Kerosene is the lubricant or coolant used, and should be supplied in liberal volume. Several qualities of abrasive stones are carried in stock constantly, and the choice for the best results is governed by the hardness of the cylinder iron, the amount of stock to be removed, the character of finish desired and the speed of the operation as regards reciprocation and rotation. As a general rule, the hardness of the stones is inversely proportional to the hardness of the cylinder iron.

The usual finish allowance ranges from .001 in. to .0015 in. for one grinding operation which is being performed in many plants in less than one minute, floor to floor time. Hupp utilizes a semi-finishing grinding operation with rather coarse stones, starting with a finish allowance of .003 in. and allowing a maximum of .0005 in. for the final satin finishing operation.

The condition after the final reaming operation determines the speed of the grinding operation, although the Hutto grinder will correct both out-of-round and tapered cylinders. This feature is made possible by the solid adjustment and backing of the stones and the use of six stones. If the cylinder is tapered, the grinder



first removes the metal at the small end and clears the larger end until the two ends are approximately of the same diameter, after which the finish is obtained by further adjustment of the stones.

When the cylinders are out of round, a condition which usually is caused by hard or soft spots in the iron, the six stone construction comes into play. A hard spot usually causes a hump which is attacked by each successive stone, with no effect at the opposite side of the wall, due to the fact that the reaction is carried by the three stones on the opposite side of the tool.

Soft Spots Protected

In the case of a depression caused by a soft spot, the stone passing over that region can not follow the contour, as it is held back by the two stones next to it. Along with the increase in effectiveness, this characteristic was largely responsible for the change from three to six stone construction. A simple diagrammatic sketch will demonstrate the manner in which the three stone grinder will allow the stone to drop into the depression.

This ability to correct faulty cylinders is based on the positive advance of the stones. Granting that the cylinder has a sufficient finishing allowance, particularly when the possibility of depressions is considered, the grinder works at smaller diameters to correct errors and finally produces a true bore of the desired size which is controlled by a positive stop on the operating head for each individual spindle.

Figs. 1 and 2 illustrate the type of driving head which is used very largely in production lines today. This type is designated as the friction or brake type, and its use has been forced largely by the lack of power in existing machine tool equipment. With all types of head, the grinder proper is driven through a floating connection which allows the lower or grinding member to center itself in the cylinder bore. This practice is similar to that of final reaming.

By means of the square control shaft *J* which has been mentioned previously, a collar and stop on the driving head determine the maximum size of the cut. When correcting for wear of the stones, the collar *K* near the lower end of the driving member is raised slightly, so that serrations *S* in it and on the inner mating member or body of the driver clear, and then is advanced one notch and lowered.

At the beginning of the grinder operation, the stops on the driving head stand about as shown in Fig. 1. After the head is inserted in the cylinder, the operator grips the lever shown at the top and thus closes a leather-lined brake *L* on the upper sleeve *M*. This sleeve carries an internal gear *N* which operates the square control shaft through an intermediate pinion *O* and a sun gear *P* in a ratio which causes the control shaft to run ahead of the floating drive connection. This action pulls the cones *E, E* nearer together and increases the effective size of the grinder head. Where four or more cylinders are being ground simultaneously, the grips are played somewhat in the fashion of a piano, until all of the heads are brought up to the sizing stop. His action is controlled by the characteristics of the machine, and the grips are manipulated so as to obtain the most effective operation without stalling.

Reversing the Shaft

At the end of the operation, the operator runs his hand along the knurled portions of the upper collars to cause them to over-run the speed of the spindles, and therefore reverse the square control shaft and retract the stones. Hupp uses a centrifugally acting driving head as shown in Fig. 3. When the clutch of the machine is thrown in with the grinding heads in the cylinder, the inertia of the heavy ring on the upper collar tends to advance the control shaft. Then at the bottom of each stroke this heavy turned ring contacts with an internal friction cone, which tends to act just as the

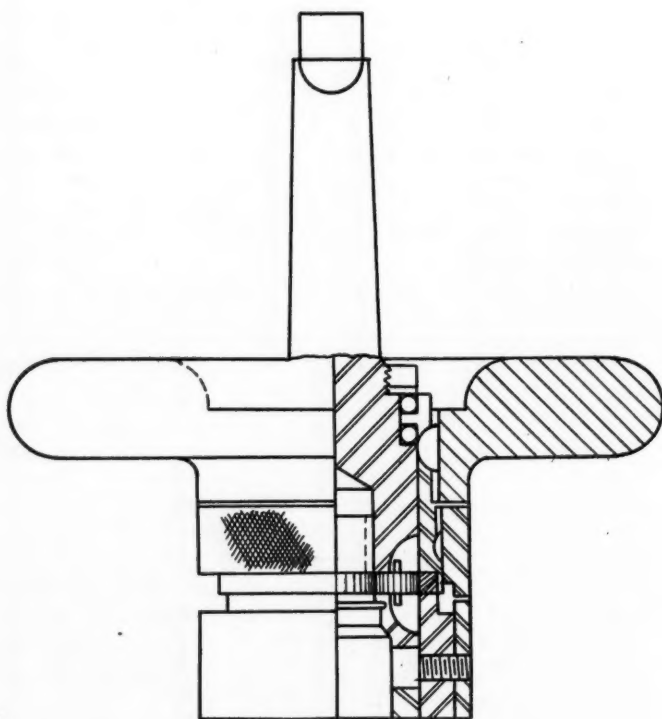


Fig. 3. Inertia type driving head, action of which tends to move stones out when starting operation and perform reverse at end of operation

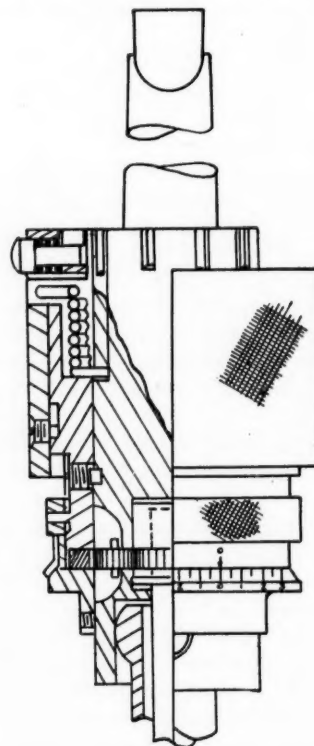


Fig. 4. Automatic type driving head in which coiled spring feeds stones out to able stop

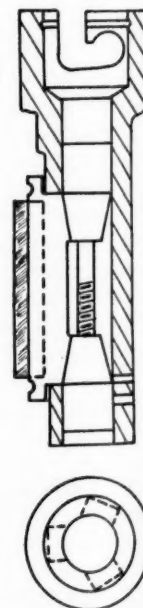


Fig. 5. 1 1/2 in. Hutto grinder having screw driver adjustment of cones

brake on the head described previously. At the end of the operation the action is reversed by the inertia of the heavy rim, when the clutch is released and the machine stops.

An automatic type of driving head is shown by Fig. 4. In all of these the sizing stop provisions are similar. With the automatic type the stones are held at the smaller diameter by the stop button shown near the top of the drawing. When this is released, a helical spring provides the advance action until the sizing stop is reached. The operator over-runs this type with his hand to retract the stones. A serrated adjustment similar to that of the sizing stop is used on the feed collar to compensate for stone wear.

In the simplest form of grinder, which is used more in service than in production work, the stone adjustment is made at a knurled head or screw driver slot which can be placed back of either the upper or lower cone. A small size grinder fitted with a screw driver adjustment is shown in Fig. 5. In this arrangement, the intermediate carrier pins are eliminated and the pressed steel carriers bear directly on the adjusting cones.

Fig. 6 illustrates a special type of sediment tank which has been developed for use with Hutto grinders. The removal of dirt, abraded material and abrasive from the kerosene stream has been found to be a factor of great importance. To this end, Hutto engineers have developed a special double jacketed tank which includes a fabric filter of very liberal dimensions. As shown, the return stream is delivered to the outer portion of the tank and passes at low velocity which allows the precipitation of dirt, etc., down through the bottom. The outlet at the bottom is in the top of the false bottom and communicates with the interior of the fabric filter through a large

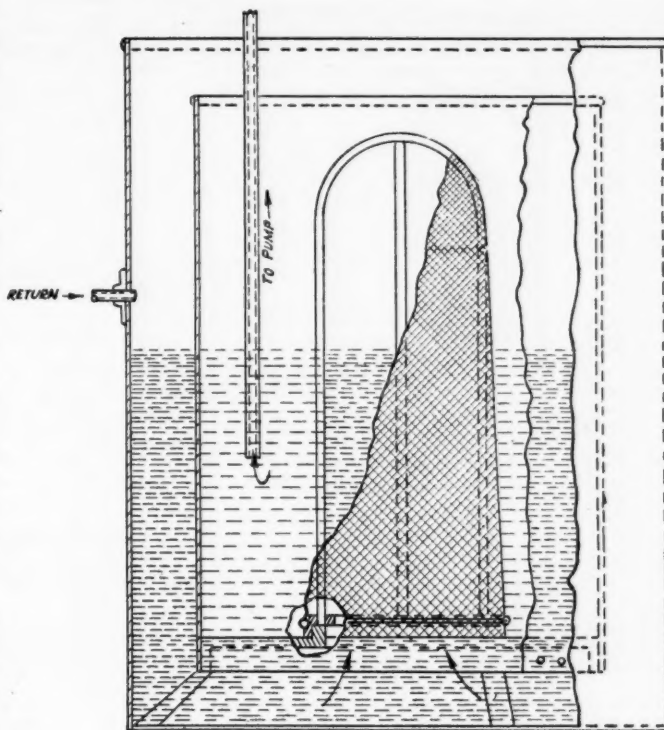


Fig. 6. Special supply and sediment tank developed for use with Hutto grinders

circular opening. By the double construction with large areas, currents and turbulence are reduced to the minimum. Solid matter tends to deposit at the bottom and relieve the work of the filter bag.

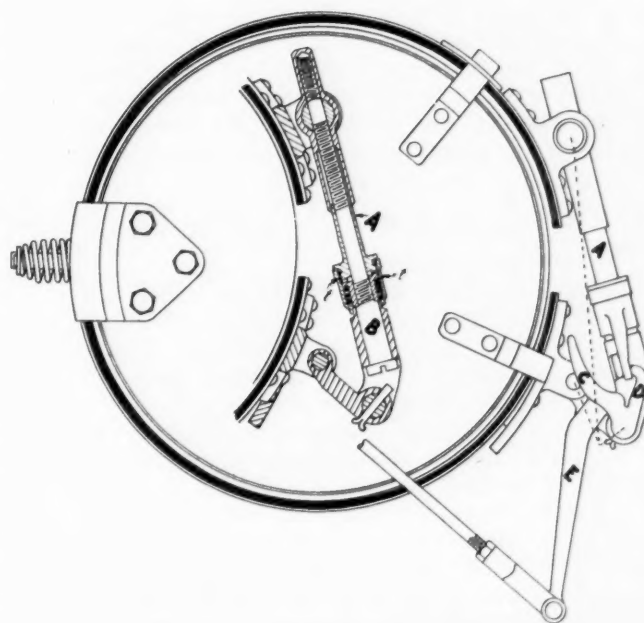
An Automatic Brake Adjusting Mechanism

A DEVICE by means of which a brake is adjusted automatically as the lining wears has been invented by A. E. Osborn, of New York City. It is claimed that with this device, since it automatically keeps the clearance between the brake band and the drum constant, the leverage of the brake linkage can be made greater, and, therefore, a more powerful braking effect obtained with a given effort of application. Supposing, for instance, that the clearance of the brake in the first instance is $1/32$ in. all around, but that this clearance increases in use, owing to wear of the lining, to $1/16$ in.; then it is necessary to make the leverage such that with the latter clearance the range of motion of the brake pedal suffices to firmly apply the brakes, whereas if the clearance always remained $1/32$ in. the leverage could be made twice as great. It is said that in one make of motor bus, in order to maintain small clearance, and thus make it possible to use a large leverage, the brakes are adjusted every day.

How Adjustment is Made

In the brake mechanism shown in the accompanying illustration, a sleeve A is mounted on the brake adjusting rod B and connected to the rod by a simple ratchet mechanism. The sleeve is oscillated by a forked member CD carried by the brake-operating lever E. When, in applying the brake, the lever exceeds the desired range of travel, a new set of ratchet teeth CC on the sleeve and adjusting rod is engaged, and upon the return of the brake parts to the normal released position, the sleeve and the adjusting rod are turned by the other, shorter arm of the fork

on the lever coming in contact with the sleeve arm. Thus whenever the travel of the brake-operating parts exceeds a certain amount, fixed by the angle between the two arms of the fork, the brake is adjusted.



Osborn automatic brake adjuster

$1\frac{1}{2}$ in.
grinder
screw
adjustment
cones

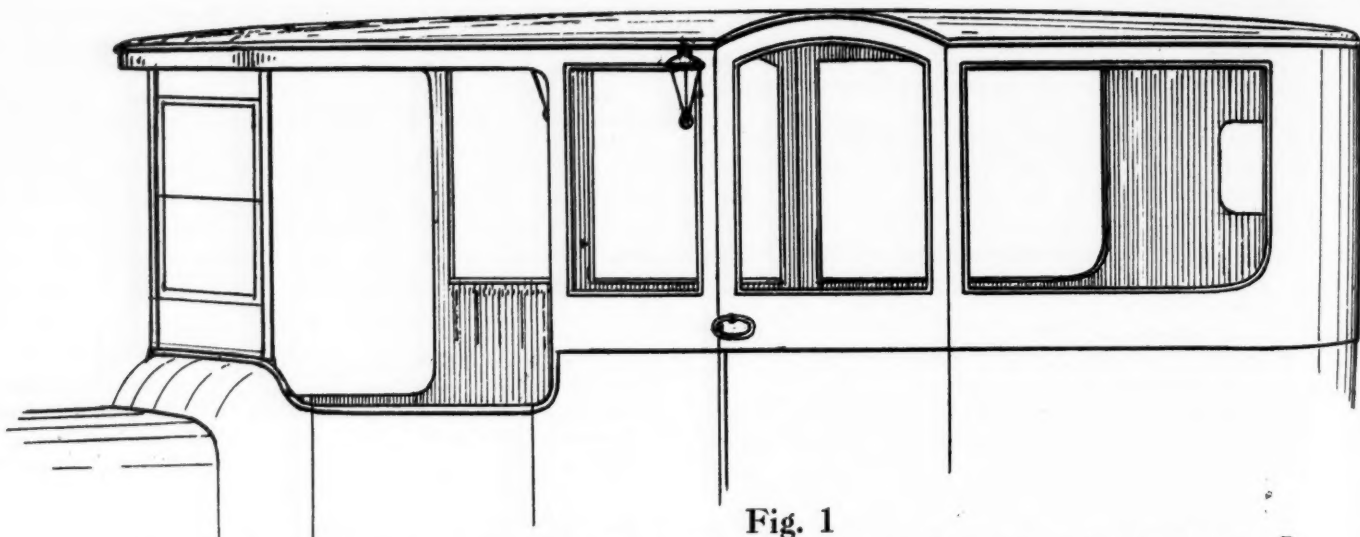


Fig. 1

One of the first attempts toward lowering the roof of closed cars. A Pierce-Arrow design of 1913

Proper Roof Design Accentuates Low Appearance of Closed Bodies

First closed cars extremely high because public demanded high doors. Constant development has evolved present soft center panel roof with metal panel around edge.

By George J. Mercer

ROOFs always have been a very important part of closed body design. This has been particularly true because the trend has been to accentuate low height, either by actually lowering the chassis or body or by so

designing the entire unit that an effect of lowness might be achieved. In both of these methods, design of the roof has a strong influence upon the results obtained.

In the earliest type of closed cars the roofs were quite flat and were equipped with wooden slats and wire guard rails so that baggage might be carried. This custom, undoubtedly, was caused by the fact that early manufacturers considered closed cars as a new form of stage coach and thought that to make them completely serviceable space had to be provided for carrying the luggage of the passengers.

This style lasted until cars with flush side bodies and forward doors were introduced, then the closed models lost their carry-all effect and began to look more like an automobile of the present time.

The roof line was still high—some 10 inches higher than interior measurements of modern cars—mainly because the public demanded high doors. In 1913 Pierce-Arrow brought out the design shown in Fig. 1, whereby a high door could be obtained while the total height of the body was decreased. This design was not copied generally but it did have the effect of focusing thought on the desirability of lower bodies.

A result of this consideration of body heights was the design shown in Fig. 2, which appeared in 1916, three years after the Pierce-Arrow design. This design obtained a low effect by dropping the front and rear of the roof and giving it a long sweep longitudinally.

At this stage of automotive development sheet aluminum was considered to be the best roof covering and the overlap quarter was in general use. These two mechanical

CHASSIS height is reaching the irreducible minimum and any further decrease in the floor-to-roof dimensions of closed bodies will leave inadequate headroom, therefore designers seeking the effect of lower appearance in the future must center their attention on the roof.

This is the conclusion set forth by Mr. Mercer, well-known body expert, in the accompanying article.

He traces the development of closed car roof design from the earliest creations up to the present and it is interesting to note that important changes in trends have occurred about every three years.

The low, smart appearance so much desired in closed cars at present cannot be much further improved upon, he says, except by continued study of roof design and the use of colored roofs which, in conjunction with the general color scheme of the car, can be made to accentuate the appearance of lowness through optical illusion.

features worked out well with the rounded roof, as the contour kept a tension on the aluminum sheet and the rounded corner at the rear of the top was necessary with the overlap panel construction.

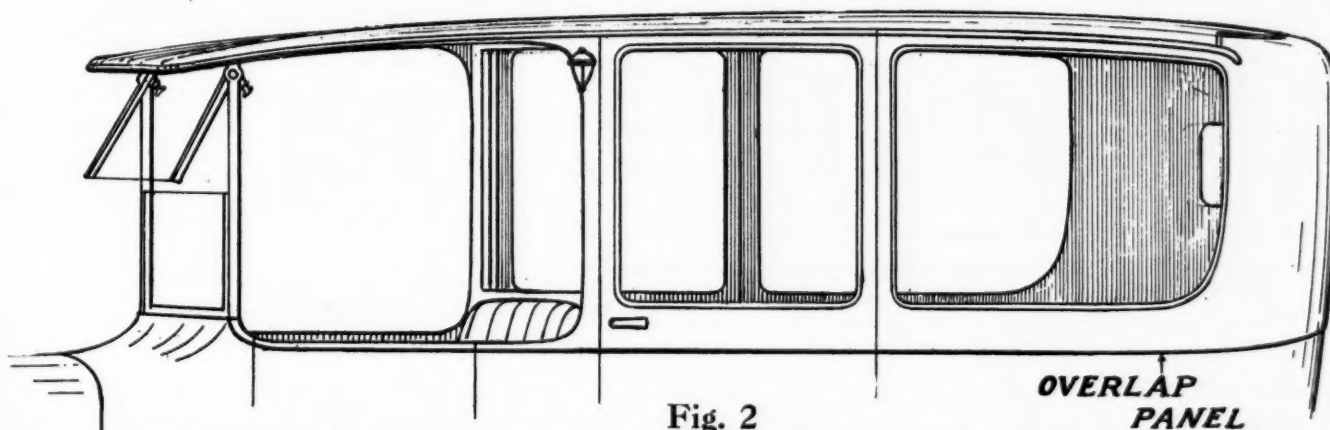
Three years later, or about 1919, the roof design of Fig. 3 was in vogue. During this period experience had taught designers that all forms of rigid roof, whether of sheet aluminum, laminated wood or fibre board, produced a condition that caused all noises to synchronize and made the interior of cars so equipped rather unpleasant. This brought soft roofs into being, the Rauch & Lang Company first using them on its electrics.

At the time of the adoption of roof designs like that pictured in Fig. 3, straight line bodies with through moldings were fashionable and the roofs were made very thin. In many old bodies now in existence which were built during this period the very thin roofs, compared with modern roofs, are quite noticeable.

During 1922 roof designs similar to that shown in Fig. 4 commenced to appear. Such designs had been used to some extent previously on custom-built bodies for high priced chassis and were adapted from the English enclosed drive cabriolet. The American design was more harmonious than its English progenitor, however, because the top of the former is not made collapsible although it has the appearance of so being.

This style of top found considerable favor because part of the total height of the body was merged into the roof, and while the actual height was not much less than with other designs, the top line of window and door openings was lower and the large radius of the roof corners prevented the increased thickness of the roof from looking bulky.

Figs. 5 and 6 are close copies of new model roofs on modern high priced cars. The principle feature which makes them different from roofs such as shown in Fig.



This design, of 1916, introduced the dropped front and back joined by a long longitudinal curve. Roof material is sheet aluminum

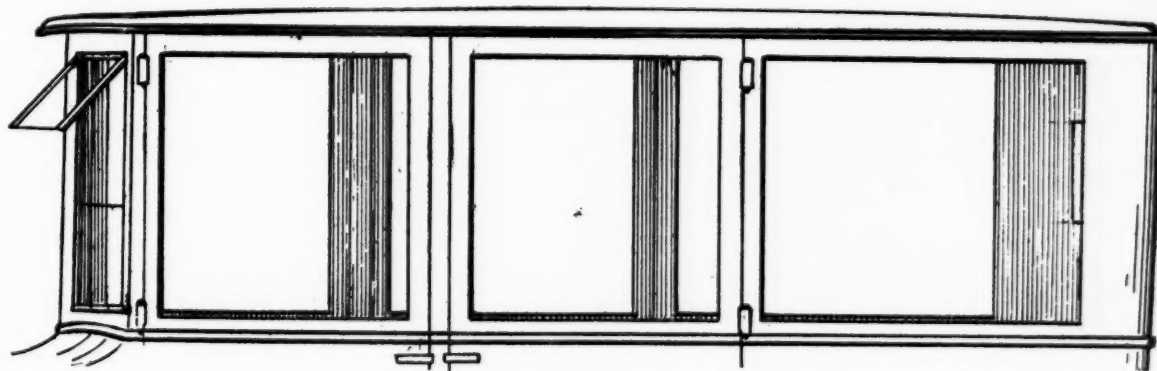


Fig. 3
A roof design of 1919 when straight line bodies and very thin roofs were the fashion in automotive circles

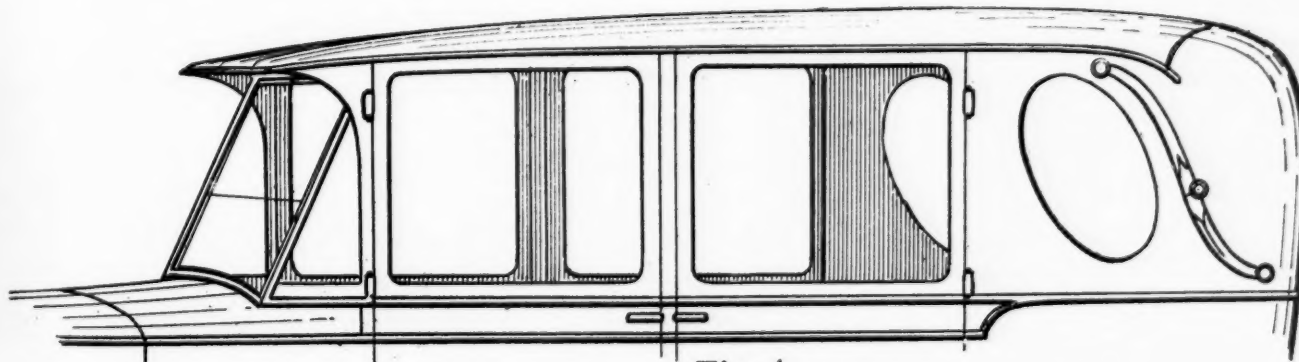


Fig. 4
This style roof, introduced in 1922, was patterned after English enclosed-drive cabriolets

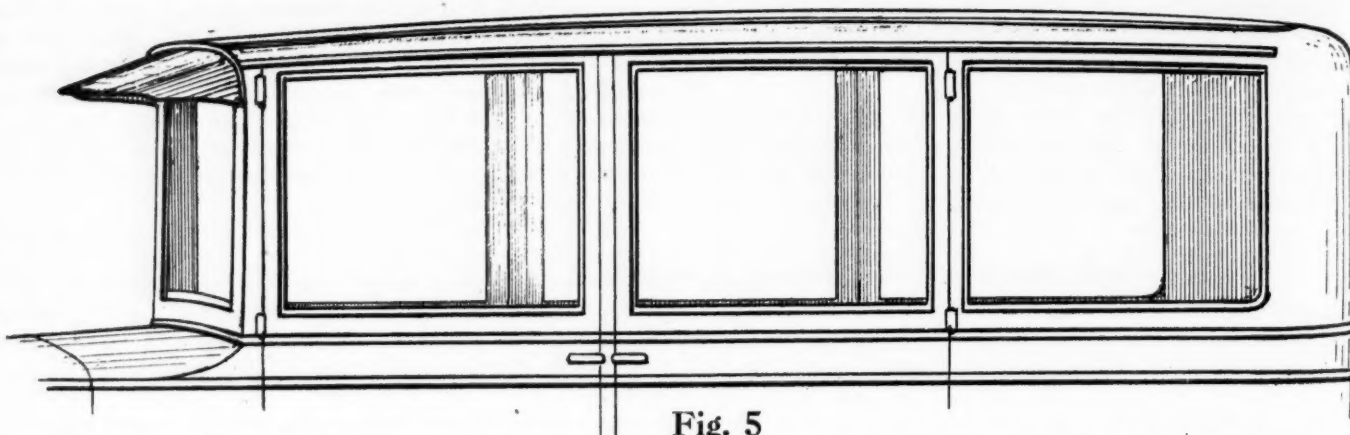


Fig. 5

A modern roof design used on high-priced cars in which a fabric center panel is surrounded by metal sheets forming the corners and sides

4 is the use of a soft center panel and a sheet metal panel extending all around the edge of the roof. This design gives the advantage of a soft roof to eliminate excess noise, with a metal surface on that part of the roof ordinarily visible so that it can be included in the decorating scheme applied to the entire car.

In usual fabric tops the fabric is brought over the edges of the roof and extends to the drip moldings. When the soft roof was first introduced the fabric used had a dull finish and the contrast between the highly polished metal of the quarters and back panel and that part of the fabric which showed was very noticeable and considered objectionable by some. Recently, however, roof fabrics have been developed with lustrous finish which harmonize quite well with the polished metal parts of the body.

In fact, use of lustrous finish fabric in the usual way often gives better results than the use of metal sides and fabric center panel. This is true because the fabric panel is visible from a distance, either from another car or when on foot, but the decorator, possibly not appreciating this fact, sometimes uses a black fabric with light colored metal parts, or fabric of inferior finish. Either of these practices, which have been used on various cars, detract considerably from the general appearance of the body when viewed from a distance.

A third objection to fabric center panels is that care is not always used in installing them. Fig. 7 shows two cross sections of a roof. At the right is shown a roof in which the finish molding is set on top the junction between the fabric panel and the metal sides. At the left the molding is stepped down and the center panel is given a raised effect which looks much better.

The fabric in the center panel is nearly as conspicuous as when it is brought down over the sides and unless its quality and the method of applying it is at least as good

as that used when the usual fabric top is employed the general appearance of the job is likely to be lowered instead of improved.

There are possibilities, however, in using fabric center panels as a means of obtaining a lower appearance. If the drip molding is continued all around the back, a light color applied to the roof and a darker color to the panel below the drip, the light colored roof appears to merge



Fig. 7

Two methods used in mounting molding with flexible center panels

into the darker lower portion and the height registered by the eye is from the top of the dark panel only. It is a mistake to have light colored side panels and dark roof panel. The latter should never be darker than the metal parts of the roof.

The shape of the roofs shown in Figs. 5 and 6, particularly in Fig. 6, are of more importance than the use of fabric roof panels. The longitudinal curve is greater than is customary for this type of body; the depth of the roof from the drip molding up to the center of the curve is greater than usual; and the lines of the side roof rails and the tops of doors and windows have been curved slightly to meet the conditions imposed by the greater roof curve in order to eliminate thin places at each end as would be present unless the side rails were curved.

Any further apparent reduction in height must be made through design of roof and body lines and of colors so that an optical illusion of greater lowness than is actually present may be obtained.

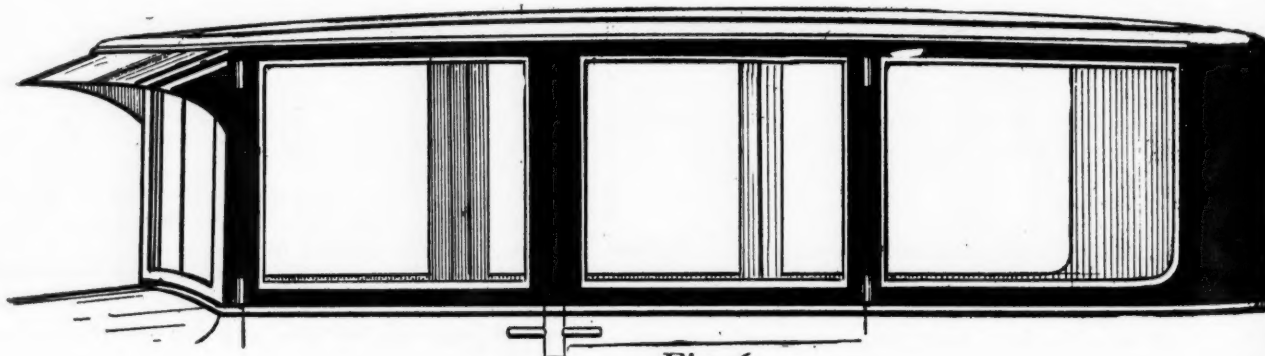


Fig. 6

Another design of the same general type as that shown in Fig. 5

Just Among Ourselves

A Compliment Returned After 25 Years

TWENTY-FIVE years ago F. E. Moskovics, president, Stutz Motor Car Co., bought from Glen Curtiss one of the first two-cylinder motorcycles ever built. Mr. Curtiss then was building Hercules motorcycles and Mr. Moskovics was captain of the New York Motorcycle Club and was seeking some machine with which his club could turn the tide of defeat which had been surging over it for some time in the form of the Brooklyn Alpha Club. Now Mr. Curtiss has returned the compliment. He has ordered from Florida one of Mr. Moskovics's new Stutz cars.

* * *

Mental Flexibility— The Chauffeur of Progress

THE vital need for flexibility of mind, warding off of dogmatism and care in making assumptions, becomes more apparent every year in observing automotive progress both in engineering and marketing. Assumptions are necessary, of course, as a basis for action; therefore assumptions are made every day—and quite properly. The trouble arises when new knowledge actually becomes available which tends to prove incorrect the assumptions previously made. In trying to make a man see the incorrectness of his belief about a particular problem, one is up against the difficulty of disproving a whole system of thought. The man probably feels subconsciously that by admitting error in the particular instance he simply may be giving an illustration of all-round incompetent thinking. And yet the ability to give up assumptions, both specific and general, when, as and if new data are available is essential to automotive progress. For some stimulating thoughts bearing on the

relation of scientific progress to the minds of men, we recommend the little book of brief essays called "Aspects of Science," written by J. W. N. Sullivan and published recently by Alfred A. Knopf, New York. We're just half through the volume now and have found on every page at least two things worth thinking about further.

* * *

When a Truth Looks Obvious—Watch Out!

HERE are a few lines from the essay on "Assumptions": "It is interesting to review the progress of science and to see it as a gradual secession from unwarrantable assumptions. The exceedingly cautious, the almost groping character of the advance of knowledge becomes very apparent. The Inquisitorial examination of Galileo was not directed merely to correcting the erroneous statement of an isolated fact; it was, in truth, a whole system of thought that stood on trial. It is this double aspect of any given abandoned assumption that accounts for our unimaginative surprise on learning that very intelligent men once mistook it for an obvious truth. We are judging the assumption, not on its own merits, as it were, but from the standpoint of an alien system of thought."

* * *

Novel Sales Methods in the Byways of the World

THIRTEEN months without once sleeping under a fixed roof is not the story of a hobo, but the record of M. Dulaurens, traveling representative of the Tecalemit Company, a French organization handling Alemite lubricator and other American accessories on the Continent of Europe. More than a year ago M. Dulaurens set out from Paris with a motor car-

van fitted up to accommodate himself and his wife, his intention being to visit dealers in Morocco, Algeria, Tunisia and various parts of France. He returned recently after covering about eight thousand miles and reports that during the trip he never slept anywhere but in his automobile. Not only did the representative get free advertising for his goods, but by means of his method of traveling he was able to come in close contact with dealers everywhere and to visit towns not easily accessible by railroad. After fitting out in Paris, M. Dulaurens will start again for a cruise of 12 to 18 months duration, during which he will cover France, the entire coast line of Italy, the Island of Sicily, Northern Italy, Spain, Algeria and Morocco.

* * *

Service Needed Most When Sales Are Good

TALKING at a dealer dinner recently C. W. Nash made one point about service which every car maker might well emphasize to his dealers at this time. "It is at times like these," Mr. Nash pointed out, "when the dealer finds himself in the position of having more orders than he can fill, that he is likely to become lax in his attention to those who already have bought and who are driving the car he represents. . . . This is the most serious mistake he can possibly make. The public has a right to expect prompt and efficient service at all times and under all conditions." It might be hard to get people interested in anything that doesn't absolutely require immediate attention. Yet those men and organizations which make conspicuous successes usually are those which do things before necessity requires their doing. Courteous and effective service in times of easy selling is one of those things.—N. G. S.

THIS is the last of a series of four articles in *Automotive Industries* on the subject of temperature measurement and control in automotive production.

The three previous articles appeared as follows:

Construction and Use of Thermo-Couples—December 24, 1925.

Indicating and Recording Pyrometers—January 21, 1926.

Automatic Systems of Temperature Control—January 28, 1926.

Special Valves Used for Automatic Temperature Control

Are operated either by an electric motor, a solenoid or gas pressure. May shut off and turn on fuel only, or both fuel and air. Systems used in lumber drying kilns are described.

By P. M. Heldt

IN automatic control of temperatures, the control pyrometer, of course, acts through a fuel valve, and these fuel valves are the basis of a separate and comparatively new industry, although in a few instances they are manufactured by the same firm as the pyrometers. Fig. 1 illustrates a motor-operated valve manufactured by Dickson Industrial Equipment, 310 South Michigan Blvd., Chicago. The power unit, which is the same for valves of all sizes, is designed to operate directly from the lighting circuit, whether direct or alternating current, no relay or external switch being required. When contact is established by the control pyrometer, the motor starts, and through a series of enclosed gears operates a cam, which either opens or closes the valve, according to whether contact was made at the low or high point. The motor keeps on turning until the cam has made one-half revolution, which corresponds to the change from full open to closed valve, or vice versa, and then stops and remains stationary until contact is established at the other point on the pyrometer. Then the cycle of the cam is completed.

In order to be able to shut off the fuel quickly in case of failure of the automatic device, due to the blowing of a fuse, interruption in the current supply or failure of

the motor, a hand wheel is provided at one end of the power unit by which the fuel can be shut off by hand at any time. This hand wheel also serves as an indicator of the valve position, a glance at it showing immediately whether the valve is open or closed. The valve is arranged to close in about 2 seconds.

Another device made by the same firm combines an air and a gas valve both opened and closed by the same power unit. The gas valve is a specially designed unit in which the movable part rests on a seat both when open and closed, whereby the need for a packing gland is eliminated. The air valve is a butterfly type, which is said to be the type best suited for the control of air at low pressures. While the unit here shown shuts off the fuel and air supply completely, a by-pass arrangement has been designed by this firm which is said to permit of accurately adjusting the fuel supply so as to maintain an even temperature.

Automatic air and fuel valves which operate without the use of a motor are made by Geissinger Furnace Control, Detroit, Mich. They are made in two types, for gas and oil fuel. As shown by the accompanying illustration (Fig. 2), the two valves are connected by a flanged casting inside of which the electrical mechanism is located. There are no moving parts on the outside, no stuffing boxes are used, and the design of the oil valve is said to be such that it cannot be injured by sand in the oil.

Maximum-Minimum Type

The air-oil valve, here illustrated, is of the maximum-minimum type; that is, it has a by-pass around the valves in both the oil and the air lines, through which a certain amount of air and oil will pass when the valve is closed. One of the chief claims made for this valve is that it automatically cuts down the air and fuel supply if the control power fails. The valve also cuts down the fuel supply if the fan power should fail and the air pressure, in consequence, drop below a certain minimum.

In connection with the valves above described, there is used a control panel (Fig. 3), on which are mounted the relay, switch, pilot lamp and fuses. The pilot lamp serves to facilitate the setting of the running temperature, and it also serves to show the state of the furnace, whether it is up to its normal temperature or coming up. In one

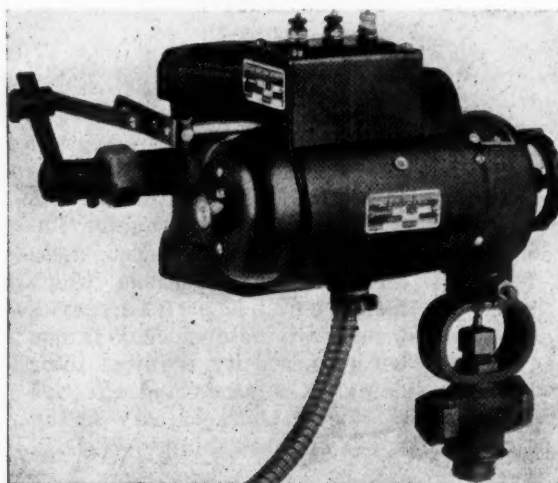


Fig. 1—Dixon motor-operated oil and air valve

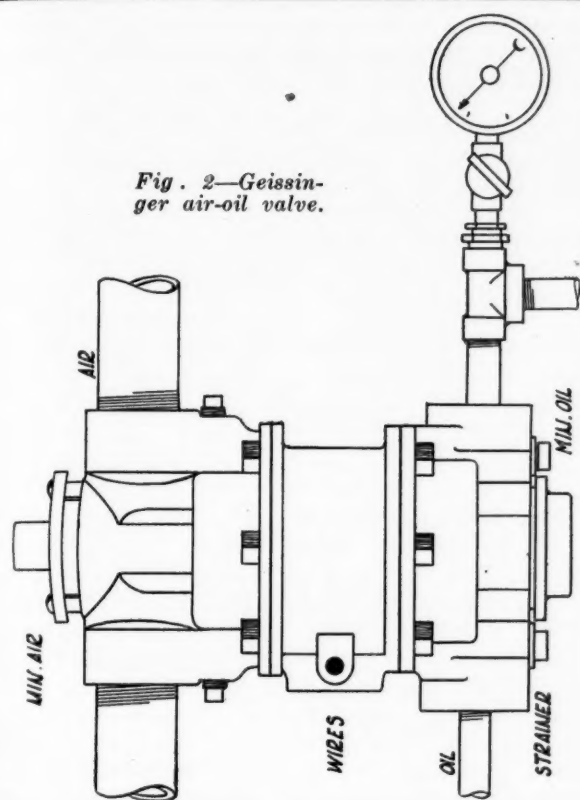


Fig. 2—Geissinger air-oil valve.

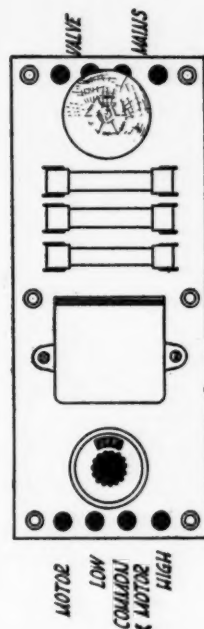


Fig. 3—Geissinger control panel

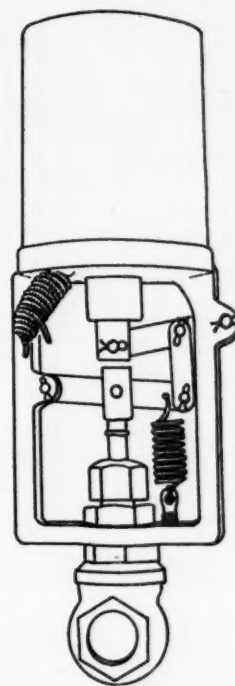


Fig. 4—Engelhard solenoid valve

position of the panel switch the furnace is on automatic control, while the other two positions of the switch serve for remote manual control of the fuel valve during temporary repairs to the meter. The control panel may be connected up to any make of control pyrometer, whether of the indicating or recording type.

Solenoid-Operated Valve

A type of solenoid-operated valve is illustrated in Fig. 4, this being manufactured by Charles Engelhard, Inc., New York. It will be noticed from the illustration that the core of the solenoid connects to the valve stem through double levers, so that a considerable multiplication of the pull is obtained. These solenoid valves are made in both the balanced type, for use where the fluid to be controlled is under considerable pressure, and the unbalanced type, for use where the pressure does not exceed 10 lb. p. sq. in. In the balanced type the pressure of the fluid does not tend to either open or close the valve.

Solenoid valves can be operated from any instrument having maximum and minimum contacts, but in every case a relay must be used, as the comparatively heavy currents and high voltage of the solenoid would injure the contacts of the instrument. In addition, a timing contactor is required in connection with these valves.

Solenoid valves are usually mounted on a by-pass in the pipe line, of such a size as compared with the main line that when the valve is open the temperature in the furnace, etc., will slowly increase, while when it is closed the temperature will slowly decrease. The by-pass should be no larger than necessary to ensure that under extreme conditions its opening will produce an increase and its closing a decrease in temperature, as this tends to enhance the closeness of regulation. If the by-pass is too large, the temperature will rise and fall rapidly and a sort of hunting action take place.

Automatic controllers actuated by vapor pressure are used where the temperatures to be controlled are moderate.

As made by the Taylor Instrument Companies, for instance, they are adapted for controlling temperatures within the limits of 30 and 650 deg. F., and they are used for such purposes as controlling the temperature of drying and japanning ovens, dry kilns, vulcanizing rooms, etc.

These control devices comprise a bulb containing the volatile fluid which can be placed where the temperature is to be controlled. The bulbs are made of metal, either steel, copper or monel metal, and different forms are used depending upon whether the bulb must make an air-tight joint with the wall of the chamber to be controlled or not. From the bulb a capillary copper tube extends to the instrument, the tube being protected against mechanical injury by a flexible metal armor. The instrument may be located at 75 ft. or more from the bulb.

Where somewhat higher temperatures must be controlled, gas-actuated electric contact controls may be used. These work on a principle similar to that of vapor pressure control, but with some important differences. Owing to the fact that the inert gases with which the system is filled obey Boyle's law, the distance between the contacts represents the same temperature difference at any position on the scale. This is not true with the vapor pressure control system, as the pressure-temperature curve of vapors departs greatly from a straight line.

Moreover, the vapor pressure depends largely upon the maximum temperature to which any portion of the liquid in the system has been raised, while the gas pressure is dependent upon the average pressure of all the gas in the system. Therefore, with the gas pressure system it is necessary to make the bulb of such form that any changes in the temperature of the surrounding atmosphere will be quickly communicated to all of the gas in the bulb.

For this reason, what is actually used with this system as the temperature-sensitive element is not a bulb at all but a coil formed of a capillary tube. Thus the area through which heat can be absorbed is greatly increased, while the amount of gas which must be heated is small.

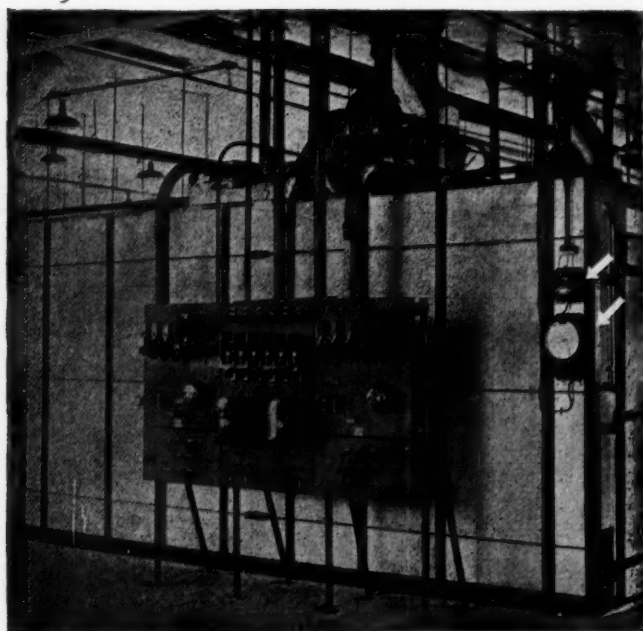


Fig. 5—Tycos electric contact temperature control installed on an electrically heated enameling oven, together with a Tycos recording thermometer

The gas pressure or vapor pressure generated by the heat in both of the systems described acts on a Bourdon tube as used in pressure gages, and the hand connected to this tube makes and breaks the electrical contact. The gas-actuated electric contact control is said to be particularly adapted for controlling the temperature of enameling ovens.

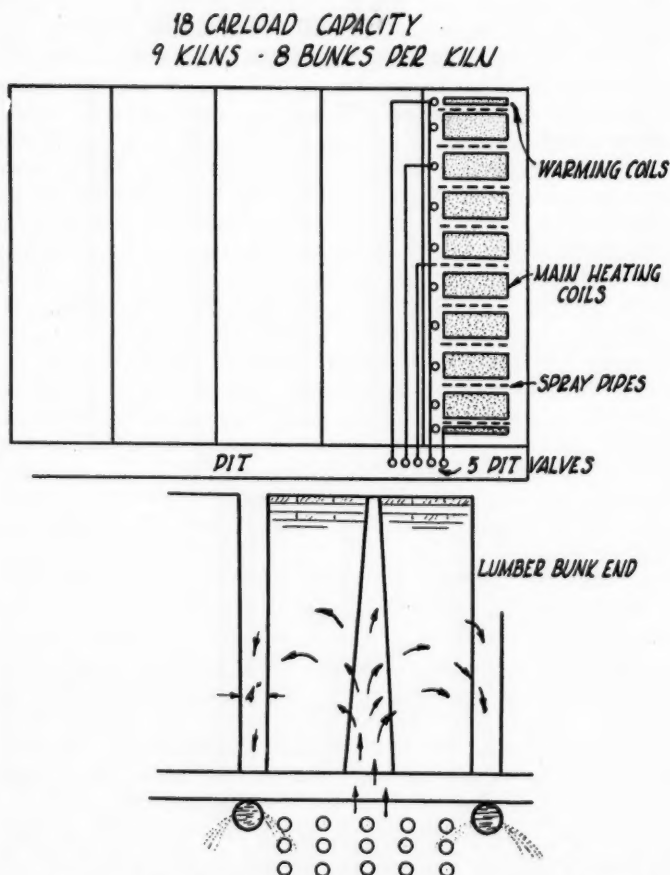


Fig. 6—Arrangement of lumber in a modern dry kiln (recording thermometers are used as a check on the temperature control)

An electrically heated enameling oven with Tycos gas-actuated electric contact temperature control is illustrated in Fig. 5. A Tycos recording thermometer is installed directly below the temperature control.

Temperature Control in Dry Kilns

The writer is indebted to E. J. Barlett, president of the Baker, Rauch & Lang Co., for the following information on the use of temperature measuring and control equipment in the kiln-drying of lumber. This company, about two years ago, installed a new kiln in collaboration with the Standard Dry Kiln Co., of Indianapolis, Ind. This was the first kiln of the type built and was constructed under patents of D. R. Brewster, a well-known expert on the kiln-drying of lumber.

One of the principles on which the design of this kiln is based is that of individual control. Each compartment contains ten banks of steam heating pipes arranged cross-wise, the end banks being about one-half the size of the inside banks and intended to maintain the temperature at the outer ends of the compartment.

Over each of the eight main banks of steam pipes is placed one of the eight bunks of lumber to be dried. These bunks are 6 ft. wide, about 12 ft. high and of a length corresponding to the mill length of about 16 ft. Each of these bunks is stacked with a tapered center flue, so that the heat from the coils rising through the flue passes out on opposite sides through the 1-in. spaces between the layers of lumber, the top of the flue being sealed.

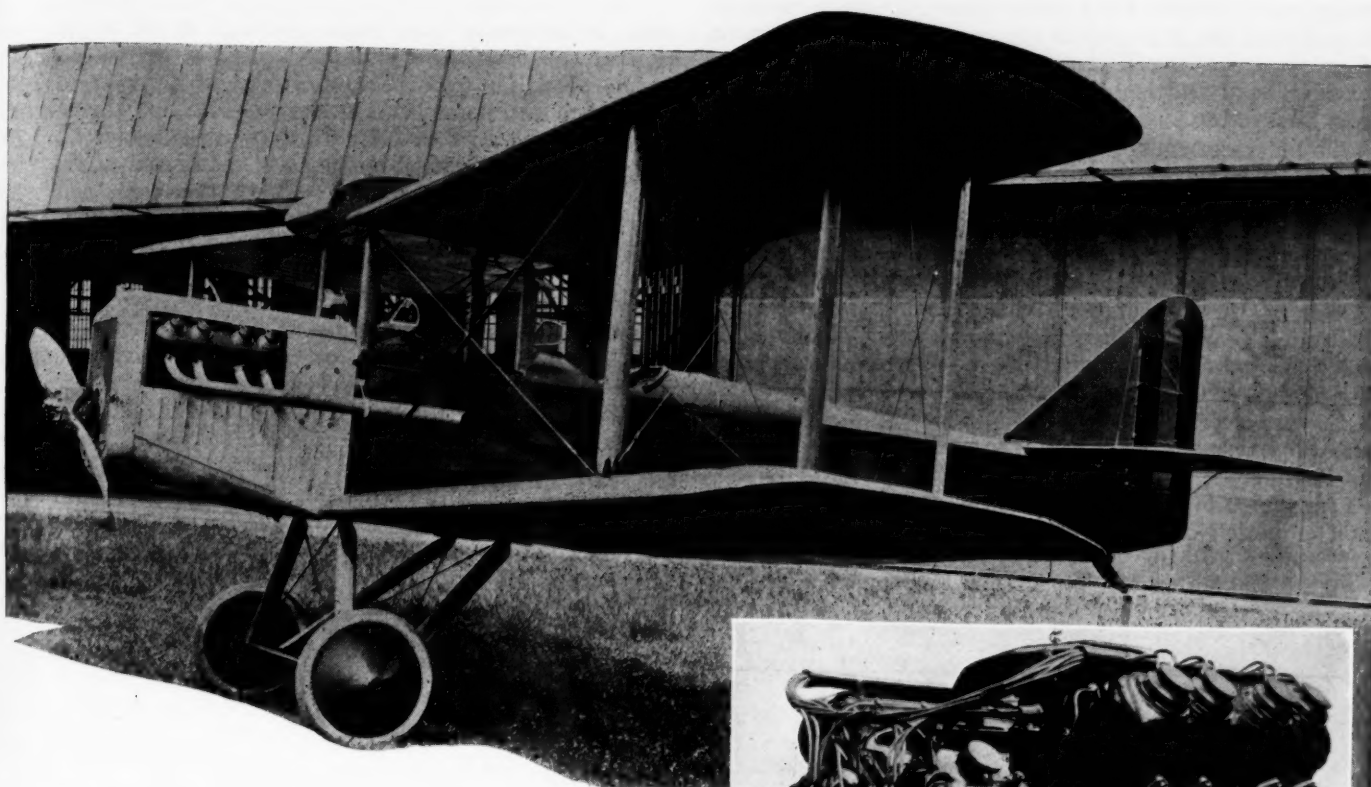
Between adjacent bunks of lumber there is a space 4 in. wide, and at the bottom of this space is located a spray pipe which discharges downwardly at angles of 45 deg. toward both sides. This spraying is intended to aid the circulation of air, which is supposed to be around the bunk of lumber. Thus one kiln compartment having eight bunks of lumber has eight independent circulating systems.

Leroy C. Mansur, who has charge of the kilns at the Baker, Rauch & Lang plant, believes that there is no substitute for direct personal supervision of the kilns, by periodically reading the instruments at different parts of the kiln. As a check for temperature only, Bristol recording thermometers are used, the charts obtained from these showing the variations of temperature throughout a week. These are used more as a check on anything unusual that may happen during holidays, Sundays, etc., when Mr. Mansur is not in attendance.

It has been found that accurate recording of the humidity necessitates accurate adjustment and examination of the wet bulb on the instrument located in the kiln. These wet bulbs must be served by quite accurate dripping of water supplied from an outside source whose temperature or rate of flow may vary and throw off the readings of the instrument. For this reason, although the instruments used are of the double pen type, adapted to record both the temperature and the humidity, the humidity recording feature is not used.

The temperature records, of course, apply to one point of the kiln only, and are used as a general check only and not depended upon for uniformity of temperature conditions throughout the kiln. The recorder used is of the vapor pressure type.

The temperature employed by Baker, Rauch & Lang in drying hardwood lumber for bodies, consisting mainly of maple and ash, with sometimes a little oak and elm, varies from approximately 110 deg. at the start of the charge to 180 deg. at the finish. The humidity varies from the saturation point at the low temperature or start of the drying process to about 20 per cent saturation at the finish.



Belgium Adopts New Knight-Type Airplane Engine

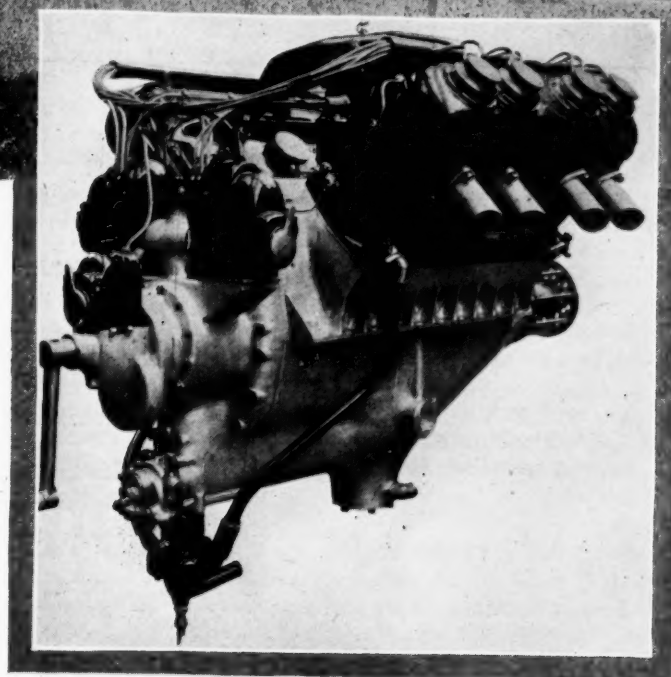
*Sleeve valve powerplant built by Minerva
passes official test—12-cylinder
model will develop 600 hp.*

By W. F. Bradley

KNIGHT-TYPE double sleeve valve engines are making an important bid for service in airplanes in Europe. Following the appearance of the 500 hp. Panhard engine, to which reference has been made in these columns, an eight-cylinder Knight-type aircraft engine of 150 hp. has been produced in Belgium by the Minerva Company and has been accepted by the Belgian Government Air Service.

This 150 hp. model has been looked upon as an experimental type and served as a basis for the design of a 12-cylinder engine of the same general type, of 600 hp., which is the size of unit more largely required for commercial planes, but the 150 hp. model has also been placed in production for use on training planes.

Originally built with 100 by 150 mm. cylinders (3.9 by 5.9 in.), giving a piston displacement of 575 cu. in., the engine later had the bore increased to give a displacement of 633 cu. in. During its acceptance tests the original engine was run at full power for one hour and then went through an endurance test consisting of three periods of ten hours at nine-tenths the maximum power.



Rear of Minerva 150 hp. Knight-type aviation engine, showing method of mounting magnetos and oil and water pumps. Above: A Belgian Air Service school plane equipped with an engine of this type. A larger model, developing 600 hp., has been designed for heavy service

During the hour-test the power developed was 154 hp. at 1818 r.p.m. with a gasoline consumption of 228 grammes (0.502 lb.) per hp.h., and in the endurance test the average power was 139.4 hp. at 1809 r.p.m., with a gasoline consumption of 322.7 grammes (0.514 lb.) and an oil consumption of 0.024 lb. per hp.h. The water temperature during the hour-test was 132 deg. at the inlet and 163 deg. at the outlet. The oil temperature was 141 deg. at inlet and 159 at outlet. The compression ratio was 5.3.

Inclusive of the propeller hub, the engine weighs 496 lb. or 3.19 lb. p. hp. The production model, with a slightly increased cylinder bore and a compression ratio of 5.5, develops 175 hp. at 1800 r.p.m. and a maximum of 180 hp. and its specific weight is reduced 2.75 lb. p. hp.

All the features of the eight-cylinder engine will be incorporated in the bigger 12-cylinder model. Among these features are cylinders in Alpax metal, an aluminum

bronze outer sleeve, steel inner sleeve, a special method of mounting the lugs on the sleeves, an improved system of pressure water circulation around the plugs and the cylinder head and isolation of the cylinder head gasket from the water.

The blocks of four cylinders, cast in Alpax metal with the intake passages forming a part of the casting and surrounded by the cooling water, are mounted on an aluminum crankcase. The crankcase consists of three castings—the upper portion in which the crankshaft and the two eccentric shafts are mounted, the lower portion containing the oil pumps, and a rear housing covering the timing gears and carrying the magnetos, the gasoline and water pumps, oil regulating valve and engine revolution counter drive mechanism. This groups the whole of the accessories at the rear of the engine. The carburetors are mounted in the Vee and the exhaust is on the outside.

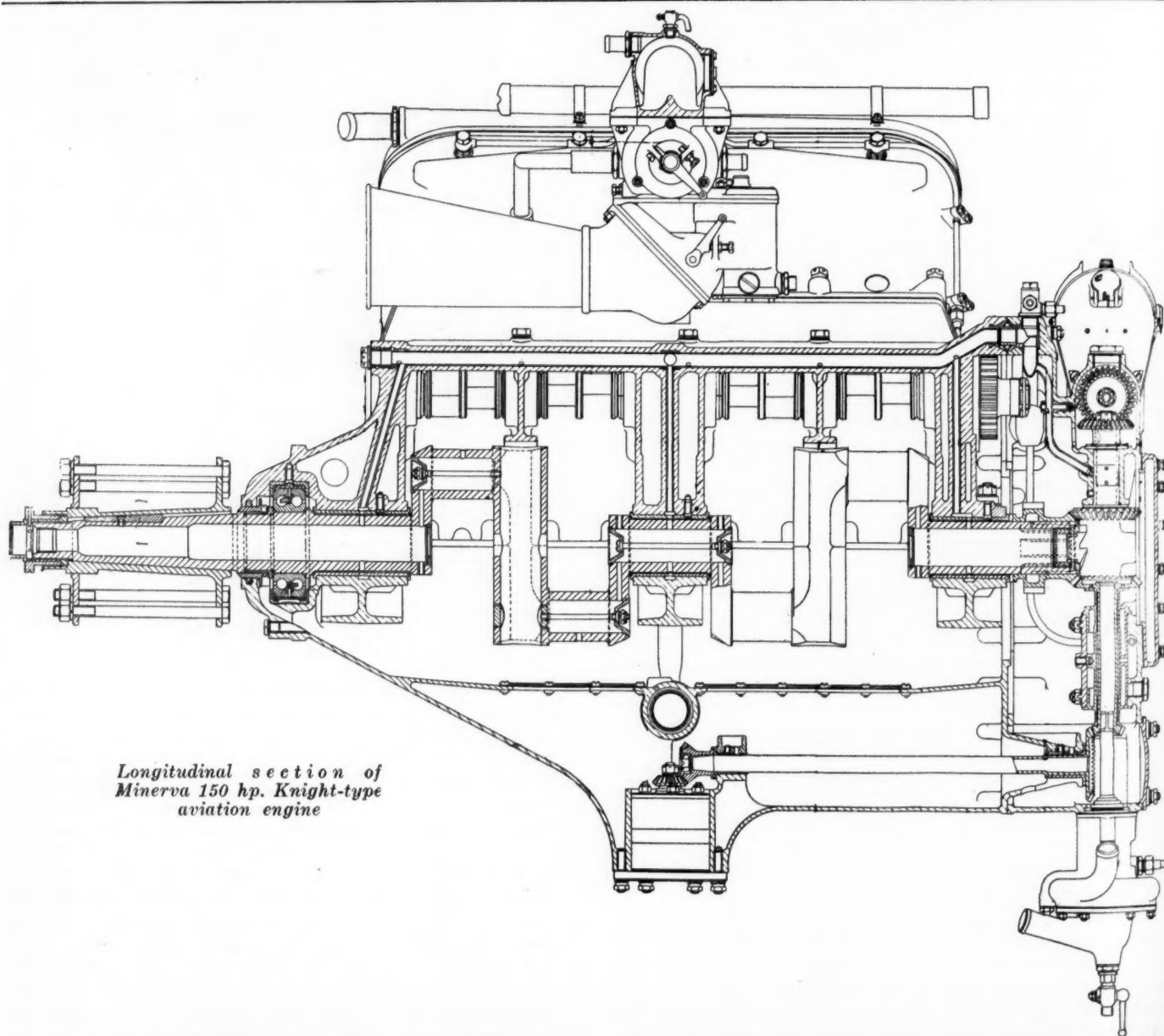
Alpax metal is made use of for the cylinder heads, each of which carries a couple of spark plugs screwed into bronze bosses. These are cast in with the head, with a shoulder on the inner face to provide a greater bearing against explosive pressure.

The crankshaft, which is of chrome-nickel heat-treated steel, is carried in three plain bearings in the upper portion of the crankcase and has a double thrust bearing at the propeller end. The shaft has a diameter of 2.04 in. for the crankpins, 2.16 in. for the rear and the central bearings, and 2.36 in. for the forward bearing. The length of the forward bearing is 4.02 in., and of the two other main bearings 3.34 in. Both the webs and the journals are drilled out, and the weight of the finished shaft is only 41.8 lb.

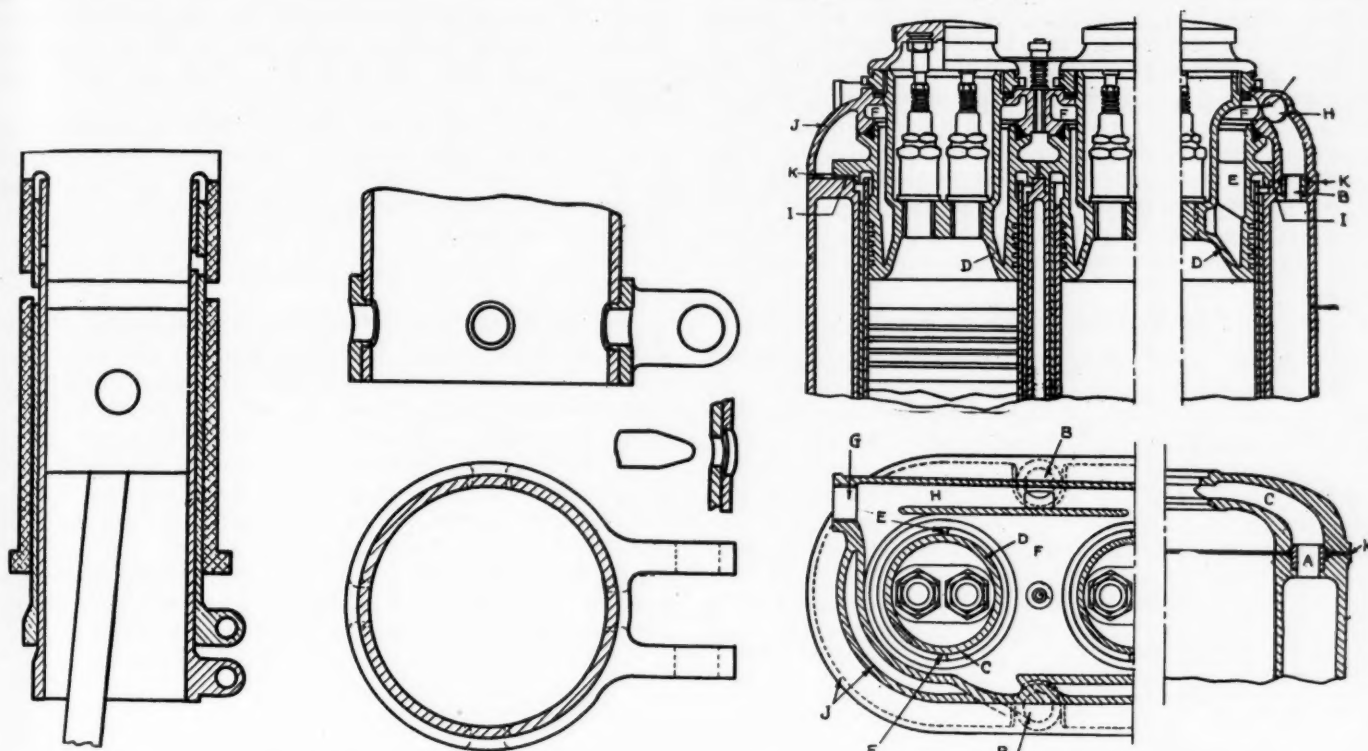
Forged Tubular Connecting Rods

Forged tubular section chrome-nickel steel connecting rods are used, the external or forked rod having a hard phosphor bronze white metal bearing on the crankpin and the internal rod bearing directly on the external part of the connecting rod bearing. The inner rod only carries an oil lead up to the piston pin, so as to assure an equal distribution of oil to the two groups of cylinders. Pistons are of aluminum alloy with four narrow compression rings and a floating, case-hardened piston pin.

Experience has shown that the natural flow of water



*Longitudinal section of
Minerva 150 hp. Knight-type
aviation engine*



LEFT: Showing combination of aluminum alloy cylinder with bronze outer sleeve and heat treated steel inner sleeve. CENTER: Method of mounting lugs on sleeve. RIGHT: Water circulation around cylinder head

in the cylinder head of a sleeve valve engine is not satisfactory when high efficiency is desired, and patents have been taken out by the Minerva Company for a forced circulation of water around the head and around the body of the spark plugs. This differs slightly according to whether the cylinders are vertical or inclined, but the principle is the same in both cases.

The head of the cylinder blocks is closed, the only water outlets from the jacket to the head being through the holes A and B. With inclined cylinders the holes B serve principally as outlets. After having cooled the cylinder walls, the water is passed through hole A and passage C to cylinder head D. As the outer water passage C is tangential to the cylinder head jacket, the water tends to take a rotary movement which, together with the inclined position of the head, assists in uniform cooling. There are two ribs E in the head, which not only give additional rigidity but are instrumental in assuring better cooling of the spark plugs. The ribs are not the full height of the head, but are broken at their lower portion and water coming from the passage C strikes them and is deflected downwards towards the base of the heads and around the spark plugs. After having passed round the head, the water travels to the collector F, which has a flattened shape to reduce its area. This collector unites the different cylinder heads and from it the water passes by outlet G to the radiator.

Water Passage Provided

In order to facilitate water flow and to avoid steam pockets, a special water passage H has been provided parallel with the collector F and cast with it. Under this patent the cylinder head gasket I is isolated from the cooling water and the cylinder head studs and nuts are not mounted in the water space. The walls J, which complete the collector F, only form a cover adding to the neat external appearance of the engine. A gap is in-

tentionally left at the base K of this cover, thus making it possible to instantly detect the slightest leak of water from the jacket or gas from the cylinders.

The eccentric shafts are mounted in five bearings of aluminum alloy. Spur pinions are used for driving the eccentric shafts, the teeth of the gears being ground.

Full Pressure Lubrication

Lubrication is entirely under pressure, the pressure maintained on the main line being about 28 lb. p. sq. in. The upper of the two pumps, which are mounted in the base of the crankcase and driven by a horizontal shaft and bevel gearing from the rear, draws oil from an independent tank and delivers it through a big capacity filter to the oil leads, where it lubricates the main and connecting rod bearings, the eccentric shafts and the water pump and magneto shafts. There are two bypasses to the cylinder walls and the head of the sleeves, but these are connected up to the carburetor control and are only opened from half throttle position, the opening increasing from this point to full throttle. The oil returns to the base of the chamber, where it is collected and returned to the tank by the scavenging pump, in order to take care of temporary flooding by reason of the inclination of the engine.

The really outstanding feature of this engine is the use of an outer sleeve of aluminum bronze in contact, by its outer surface, with the Alpax metal of the cylinder walls, and on its inner surface with a chrome-nickel heat-treated sleeve. Each sleeve has a thickness of 2.25 mm., the weight of the inner steel sleeve being 4.51 lb. and of the outer bronze sleeve 3.71 lb. Minerva claims patent rights for this combination of an aluminum or aluminum alloy cylinder in which is fitted a bronze outer sleeve and a steel inner sleeve.

Another patent has been secured for a method of

mounting the lug collars on the base of the sleeves, thus making possible the economy of a drawn steel sleeve and allowing the collar and sleeve to be of different metals. A series of holes is drilled through both the sleeve and the collar, those in the latter being slightly smaller than the former. The collar is pressed on the sleeve and by means of a suitably shaped die the metal around the small hole in the collar is forced into the bigger hole in the sleeve, thus providing circular riveting which has been found to give every satisfaction and even allows for the different heat expansion of the two metals.

Two Vertical Auxiliary Shafts

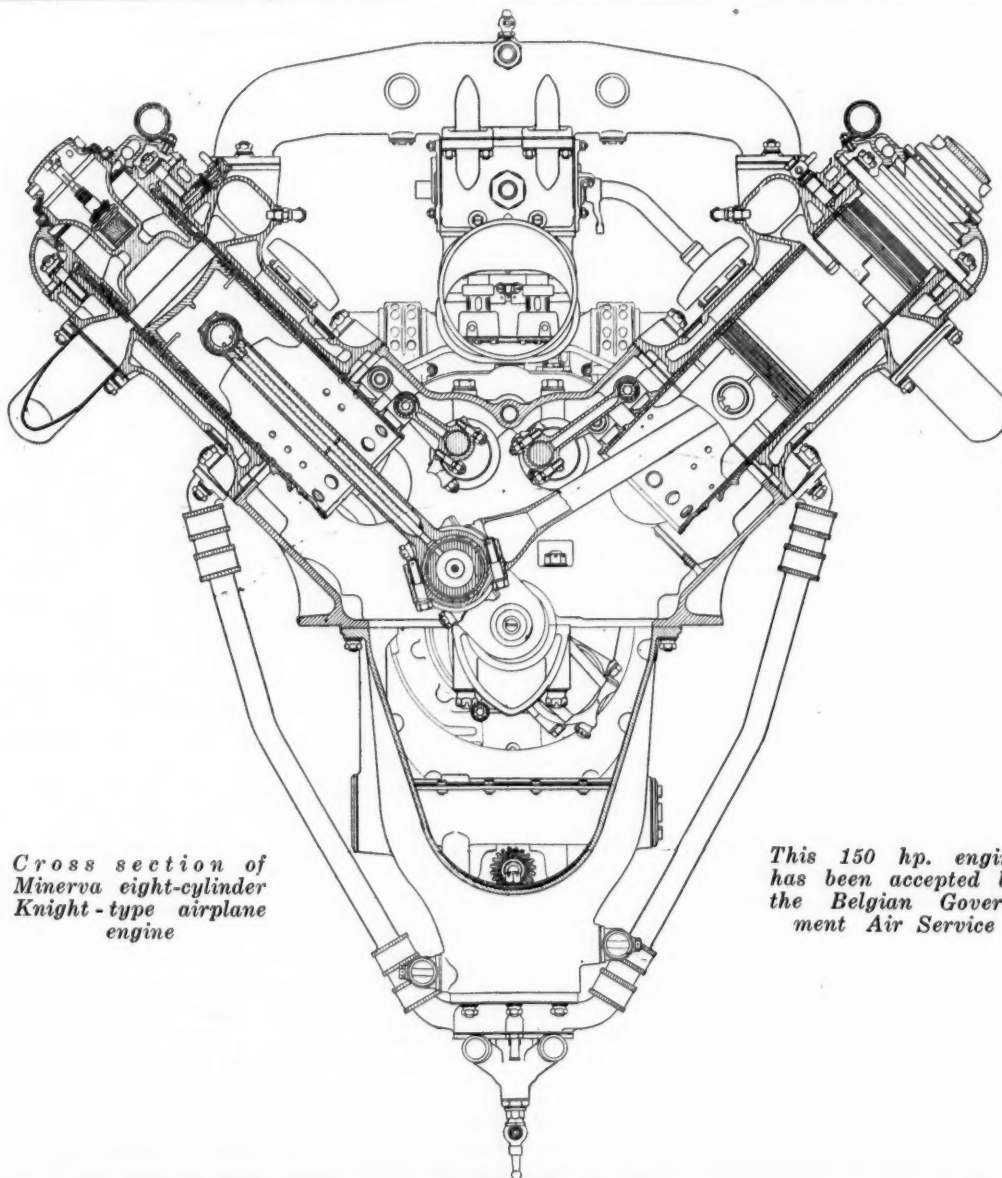
A bevel pinion at the rear of the crankshaft drives a couple of vertical shafts, the upper one operating the magneto shafts through bevel gearing and the lower one the water pump, which is thus at the extreme rear of the engine. The pump has no packing gland, water tightness being secured by the construction of the turbine and by a cone and cup, contact between the two being maintained by a spring and a ball thrust bearing running in oil.

The double Zenith carburetor carried in the Vee is joined up to a manifold uniting the two blocks and

heated by water circulation. The main air supply is drawn in through a funnel having its mouth immediately behind the radiator, thus supplying slightly warmed air. At the same time air is taken from the crankcase breathers.

Two Scintilla AG 8 magnetos are used, in conjunction with a hand starting magneto. Starting is facilitated by an Athmos injector, and a hand crank, which may be geared down when the engine is required for hydroplanes, is provided.

At a recent meeting at Dresden, representatives of Central and Northern European aircraft manufacturers proposed to form one big transport company which would employ a single type of machine, with a view to standardizing the equipment in service in the northern part of the continent. Later a conference was held at Stockholm with the object of creating an international committee for the control of air traffic. Meanwhile, the Junkers Luftschiffahrt A. G. has secured a leading interest in a company which was formed recently, composed of fifteen airplane and air navigation companies in Switzerland, Finland, Esthonia, Sweden, Denmark, Lettonia and Holland.



*Cross section of
Minerva eight-cylinder
Knight-type airplane
engine*

*This 150 hp. engine
has been accepted by
the Belgian Govern-
ment Air Service*

Design Requirements for City Type Buses Are Exacting

Metropolitan Section of S. A. E. discusses bus design and operation with particular attention being given to operating needs for service in large centers.

By Leslie H. Allen

INCREASING interest in the subject of motor bus design and operation was evidenced at the meeting of the Metropolitan Section of the Society of Automotive Engineers held at the Building Trades Club, New York City, on Feb. 18.

Attendance approaching 200 exceeded the committee's expectations and included not only local engineers, but also men from other cities as far away as Toronto. In point of attendance this was the largest meeting held by this section for 1925-26 with the possible exception of the meeting which discussed "What's New at the Show."

With Neil MacCoull of the Texas Co. as chairman, there was frank discussion of the whole field of bus design and operation with the one exception of that ticklish subject—the gas-electric bus. On that subject there were several pointed questions and some good-humored and entirely explicable side-stepping on the part of Dean J. Locke, who as staff engineer for the vice-president in charge of railway operation of the Public Service Railway Corp. of New Jersey might have been expected to enlarge on the gas-electric, since that concern recently placed a large order for buses of this type. But Mr. Locke frankly admitted that he was not in a position to discuss the gas-electric, although he might be later when the company had learned through its own experience the yes or the no of this type.

Lewis P. Kalb, assistant chief engineer of the Continental Motors Corp., also referred to the gas-electric and Joseph A. Anglada, consulting engineer and past president of the Section, brought out the fact that several years ago an S. A. E. committee had investigated the subject of gas-electrics and made a report which he assumed was still available.

Comprehensive Bus System Needed

A. E. Hutt, president and general manager of the Westchester County Bus System and also of the Borough Motor Bus Co., after describing the need of a comprehensive bus system in that county and his concern's efforts to meet that need, and also describing his own plans for a double-deck bus with raised aisle platform, remarked that he saw no reason why the use of the gas-electric type could not do away with the necessity of the chassis.

F. Van Z. Lane, formerly engineer in charge of bus planning for the Board of Transportation of the City of New York, and now vice-president and engineer of the Equitable Coach Co., Inc., operating a bus line from

the Wanamaker New York store to Philadelphia, was unable to be present to discuss the outlook for the bus in New York City; but the newspapers of the day of the meeting announced that an agreement had been reached through which franchises for bus operation in four of the five city boroughs would probably be granted for operation to begin early this summer.

There will be many applicants for these franchises, but the city leans towards city-wide operation by a single company with preference to the company which will offer a five-cent fare. If this does not work out a franchise will probably be given to a single company in each borough.

City Type Buses Discussed

Mr. Locke's paper discussed design and operation of city buses in contradistinction to the interurban type, and he spoke especially from the standpoint of experience with the single-decker. City buses must have more head room for tall persons—this point being based on the supposition that the five-cent fare line could not afford to provide a seat for every passenger, with consequent necessity of standing room.

On this point Mr. Hutt later insisted that it was a great mistake to design and operate buses on a street car basis with standing room, rattan seats and other features common to the trolley. He believed that the popularity of buses would continue to increase in proportion as the vehicles offered passengers facilities entirely different from and more luxurious than the trolley. This was one of the outstanding attractions of bus riding and manufacturers and operators could not afford to ignore or discount it.

Mr. Locke's reply was reasonable enough. In New Jersey the Public Service lines were limited to the five-cent fare. Short hauls were common and the tendency to trolley-ise bus design, at least to a reasonable extent, was a reflection of the commendable and not uncommon desire of the operating company to at least break even on its balance sheet. Hence more passengers were provided for per bus, wells were larger and seats near the entrance door were longitudinal and facing to encourage incomers to fill up the cross seats in the rear first.

Ventilation is also an important feature of city bus design. More vents are necessary than in interurban buses because the city bus does not have the advantage of air circulation caused by the speedier running of the interurban type with less frequent stops.

Mr. Locke, in discussing convenience of entrance and egress, commended the desire of certain operators to obtain buses with exit doors at the rear, thus avoiding congestion at the front door when passenger influx and outflow meet. Low level floors not more than two steps to the ground also facilitate passenger interchange.

More rigid seats with both seat and covering designed for durability are necessary, both for utility and economy. Lighting is a most important feature. The New Jersey Utilities Commission requires five candle-power lighting per passenger and the new Public Service buses are equipped to give 6.8 candle-power per person. Discussion brought out the desirability of sufficient step lights. A test had shown that good step lights would save one hour in eight of operating time through speeding up passenger interchange. The necessity of providing space for generators sufficient to insure good lighting was also stressed.

Chassis Needs for City Service

Mr. Locke said that overall length of the new Public Service models had been reduced from 96 to 90 in. He emphasized the importance of rugged frames, springs and axles and the importance of a snappier engine in the city than in the interurban bus, with gear ratios changed for high acceleration and low running speed. Designers should also remember that the city bus offers more tendency on the part of drivers to abuse clutch and transmission. More smoothly running engines were needed because vibrations and shocks originating in the engine were the chief causes of body wear.

Alexander Shapiro, of the North American Co., a bus system in the District of Columbia, discussed intercity high speed bus operation in the light of his experience in that field in Wisconsin. The exterior of the bus should show pleasing lines and colors because first appearances attracted or fended off passengers. The public expects comfortable seats, smooth running, sufficient ventilation and, in colder climes, plenty of heat.

Designers should bear in mind that the backbone of intercity bus operation was the traveling salesman who expected ample baggage room, liked a smoking compartment and would revert to trolleys or railroads if running schedules were haphazard. More frequent operation with smaller buses was more profitable than less frequent trips with larger types; and it was easier to educate the passenger public to an every-hour schedule than to one with intervals of two or three hours.

Accessibility an Important Feature

Parts must be easily accessible, replaceable and obtainable. Breakdowns on the road demanded prompt attention for the preservation of schedules. Such prompt attention was impossible if the manufacturer failed to provide easily accessible replacement parts distribution points, or if the accessibility of parts was so difficult as to cause unnecessary loss of time.

Accessibility of the gas tank is also important. Under the driver's seat the tank for refilling required removal of the seat, a hose across the entrance floor, probably gasoline leakage on that floor and perhaps a damage suit for a soiled dress or pant leg. Under the rear end the gas tank required a long gas line to the engine and in freezing temperatures this caused trouble.

The driver's seat must be comfortable. If it were not the difficulty of holding good labor is multiplied.

Maintenance of efficient service and dependability of schedules is the basis of intercity bus operating success. For proper maintenance the operating department

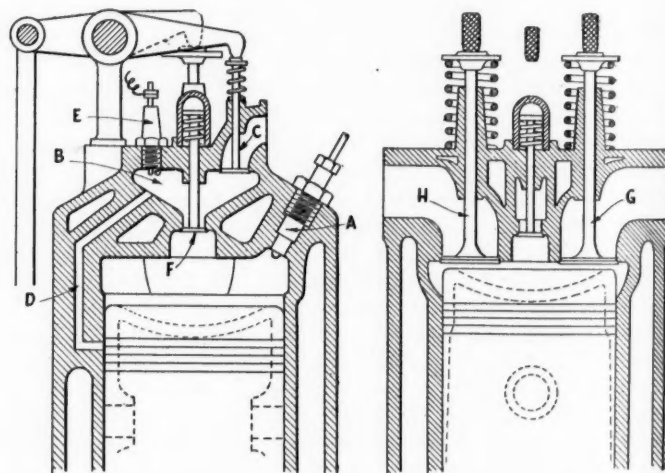
and the garage must be persuaded to work together and stop passing the buck back and forth. Mr. Shapiro emphasized the value of a system by which the driver is required to jot down on a conditioning report card, carried with the bus through the day, everything which he thinks needs attention. At night the repair foreman is required to examine each card, to see that the repairs are made properly, and to O. K. the card to that effect before the bus goes out in the morning.

Mr. Kalb read an extremely informative paper on the designing of bus engines. A more complete report of this paper will be published in *Automotive Industries* later.

Discussion developed opinions as to the relative value of aluminum and steel side panels. Mr. Locke leaned towards the aluminum type as more easily giving to dents in side collisions and thus protecting the construction. His company has replacement aluminum panels all ready for substituting for those damaged in collisions, and he said this was an important item in time-saving. There was some discussion of tires and the necessity of designing buses to take proper tire equipment was emphasized.

Renault Patents Heavy Fuel Engine

A NEW solution of the problem of burning heavy fuels in internal combustion engines has been proposed by Louis Renault (British patent 239,437, of Jan. 22, 1925). Referring to the drawings herewith, in the cylinder head between the regular inlet and the exhaust valves *G* and *H*, there is provided an ignition chamber *B* which communi-



Renault's heavy fuel engine

cates with the combustion chamber of the engine through a small automatic valve *F*, between the large valves and also through a passage *D*, the port of which is overrun by the piston toward the end of the compression stroke.

A charge composed of air and the vapors of a volatile fuel is drawn into the ignition chamber during the suction stroke through the small inlet valve *C*, and is compressed in it by pressure communicated through passage *D*. It is then fired by the spark plug *E*, and the superior pressure of the burning gases opens the valve *F* and allows the flame to shoot into the compression chamber through this valve, there igniting the main charge.

THE FORUM

Thinks Demand for Fuel Economy Will Bring Diesel Type Engine Into Use in Automotive Field

Editor AUTOMOTIVE INDUSTRIES:

Every engineer interested in research will have welcomed the discussion published in your Forum regarding oil engine application for automotive use. The value of this subject is further augmented by the criticism touching the efficiency question which is hurled at the automobile engineer under the heading "Is He Falling Down on the Job?"

As the writer has been connected with research work covering some of the feasible fundamental changes in engine control, he feels justified in answering the above question with a decided "No."

The reasons for the absence of fundamentally different commercial engines of much higher efficiency than the ordinary engine are quite manifold.

In the first place, the present day engine construction offered the least resistance in regard to general adaptability, and was thus chosen by the manufacturer to supply the demand of the rapidly multiplying mass of buyers. The industry simply had no time to listen to the predictions of the research engineer as to ultimately necessary changes. The market for the present type engine was here, and it was up to the manufacturer to fill it. The public learned to understand the construction and operation of this engine, and was willing to pay for high operating cost. And so this type has developed in the "mechanically perfected" engine of today.

A Difference of Opinion

There is a great difference of opinion regarding the subject of economy between the individual and the public as a whole. Without question a great objection would be raised if, for instance, the New York subway fare should be raised from five to eight cents, because it hits the public collectively. On the other hand a corresponding change from fifteen to twenty-three cents in the cost of gasoline was hardly commented upon by the private automobile user. Obviously the question of economy is of vital importance in the public transportation field.

With the entrance of public utility companies as users of automotive vehicles, the question of engine efficiency has aroused new interest. When taxicab companies and especially fleet owners of buses are using thousands of gallons of fuel a day, economy is demanded by the owner as well as by the passenger. If on top of this we are looking forward to ultimately higher prices of gasoline, then we will have the public and the manufacturer all lined up to look with interest upon fundamentally different engines suitable for this field, which are claimed to possess the desired feature of economy. And so the commercial

entrance of a different type of engine which is represented by the high compression Diesel type is assured. The advantages of this type were emphasized in this periodical by R. W. Hautzenroeder (January 28 issue) who nullified the pessimistic opinions of other writers.

Difficulties of a structural nature, which still seem to exist with certain experimental engines can be overcome. High average piston and bearing pressures, as well as higher localized temperatures, can either be diminished by the use of small bores or by controlling these pressures. To maintain high compression pressures which do not greatly exceed the maximum pressures in gasoline engines, should obviously not offer great technical difficulties. In regard to the problem of accurately metering and injecting the minute quantities of fuel required for part load operation of small units, the writer has had practical experience and knows that this can be and has been done by comparatively simple mechanical means. It will not be necessary to build engines of large bore, because engines of small bore (3 in. dia.) have been built and run on fuel oil. The metering and injection method for this engine worked very satisfactorily.

As was pointed out by other contributors to these discussions, the "oil-electric" power source for buses should be one of the outstanding changes in the transportation field of the near future.

P. F. HACKETHAL

Pure Diesel Type Engine on the Wane?

Editor AUTOMOTIVE INDUSTRIES:

The letter by Mr. Hautzenroeder concerning the automotive Diesel, in your January 28 issue, deserves acclaim; he is not silent on engine weaknesses! Such conduct is constructive. Mr. Hautzenroeder is evidently not fighting for his professional life among stockholders somewhat hazy as to the difference between such men as Ponzi, Faraday, Diesel. His letter adds more evidence of the number that are working toward the development of automotive oil engines.

That letter also adds emphasis to our need of more printed pages as a vehicle for the analysis and criticism of technical and associated matter not immediately commercially applicable. Naturally the regular engineering and commercial magazines cannot devote their pages to any considerable amount of matter not applying to production. Research departments of big organizations have papers prepared for "home consumption." But the number of workers on automotive oil engines who are un-

doubtedly duplicating each other's work and in the end only getting about the same distance, shows, for one field at least, the need of a vehicle for general discussion and negative criticism which, as already intimated, has as yet no market value. There seems room for some sort of a publication to handle at intervals such critical matter. It might do much to save needless work by giving new slants. Possibly an avalanche of manuscript could be obtained gratuitously.

Laboratories and Achievement

Much as we need laboratories the idea that their output is the great source of engineering conceptions, should not, I believe, be too strongly fostered. Neither Newton nor Carnot, Rankine nor Gibbs, had a million dollar laboratory at his disposal. And less luminous minds have thrown out far-reaching ideas. More public engineering criticism, more negative criticism, would indicate better what we should make. There would still remain for staunchly practical individualists the more financially associated item of how to make it.

And now I should like to add something more relating to the automotive Diesel. Mr. Hautzenroeder's depreciation of the flexibility of the hot bulb oil engine is, perhaps unfortunately, only too true. Regarding the Diesel cycle, it is attractive for all sizes of internal-combustion engines regardless of their field. Concerning air injection we have got to admit its excellence in the preparation of a combustible mixture. Physicists tell us that if the liquid is finely enough divided there is a stage when it can be vaporized by the change of energy of its own surface tension. If, besides performing fine atomization, the blast air is credited with a cooling effect that restrains cracking processes, then airless injection possibly will never—of itself and unaided—equal air injection in excellence of mixture preparation.

Personally I much prefer the idea of burning a vaporized fuel rather than of first submitting it to cracking, and then having to burn free carbon. A clean combustion chamber and the absence of smoke, highly desirable as these conditions are, should leave one watchful. When with airless injection I get a fine looking indicator card and smokeless combustion, yet a fuel consumption double that which a marine Diesel engineer looks for, I have a lurking idea that the most interesting process occurring down the expansion line is that of converting free carbon, the result of cracking, into carbon monoxide. In short, with such results I have produced but a high priced gas producer. And so, though in the airless injection camp, I am ready to hand it to air injection.

Trend Toward Airless Type

But I doubt if in America the pure Diesel engine ever gets much of a market for any size smaller than those for railcars. And the Beardmore airless is already there. The trend seems to show that the pure Diesel is on the wane. Recently one big Diesel maker has started building the airless type. A few years ago some German writers would not even countenance the possibilities of the big airless injection engine. Now that has changed. The simpler design is gaining ground. Furthermore the small Diesel engine does not blend any too well with American tastes and methods. At high r. p. m. I should expect with air injection to run into the same difficulty that we encounter with the high-speed airless injection engine—that plagued creation, an Otto cycle piled on top of a compression-ignition curve.

The Maybach engine referred to is an excellent piece of work. But if commercial development is to support military aircraft progress, I would not keenly favor the

Maybach Diesel for aircraft. It has too many jugular veins. Besides, if it does follow the strictly Diesel cycle its capacity can be excelled, and with fair economy, by the carburetor engines, for the Diesel cycle when used to give the fuel economy for which it is so well known, is, when compared with aircraft engines, a lean mixture and, therefore, low capacity engine.

As regards reports of foreign engines, we will do well, I believe, as stated in an earlier letter, to accept reports with caution. Besides the consideration of coincident values of m. e. p., r. p. m., and fuel economy, I should like to see the corresponding indicator card. This raises the point that it might be well for us to have an organization to promote competitive engine tests as a separate means to automotive and aircraft oil engine development. Something of this kind might help to bring the development of the high-speed compression-ignition engine out more from the field of mechanical problems into that of its scientific issues.

Granting there is already the railcar field for the oil engine, there are many of us who would like to see the compression-ignition engine break into a field where there would be some real numbers of engines getting into production. But besides the purely engine problems there is the question of what sort of fuel will be to the fore as most satisfactory to the engine operator when this compression-ignition engine is developed. I now refer to an engine that shall be a real competitor in the full sense with the carburetor engine. Human nature likes the engine conditions that accompany the use of refined fuels. Gasoline, however, is not a favorable compression-ignition fuel. Perhaps the chemist will make the use even of gas oil become unattractive for automotive use. Perhaps he will give us an even safer fuel than gas oil for aircraft. These statements I do not intend to be interpreted as damning the compression-ignition engine. They are intended to show the scope of the high-speed compression-ignition problem.

Three Major Problems

Three items confront the worker with high-speed compression-ignition: 1. Injection. 2. Phenomena prior to combustion. 3. Combustion. The first is pretty well mastered even for automobile engine speeds. The third is of concern, once a gasified mixture is assured, chiefly as regards pressure control. The second involves some obscure conditions. Among these is vaporization, and since I am in the airless injection camp I cannot say, as can Mr. Hautzenroeder, that "all the difficulties are structural." Frankly I believe there is a lot of money being wasted because the mechanical engineer is trying to do what the physicist and chemist are as yet unfamiliar with.

Paradoxical as it may seem in view of some of the foregoing statements, I should like to suggest that the function of the compression-ignition engine in the midst of our American automobile conditions may ultimately not be one primarily of utilizing cheap fuel. It may be called upon to contribute to the attainment of a CO-less engine. By this I mean an engine delivering no carbon-monoxide at idling as well as other loads except such as comes under the unavoidable law of chemical equilibrium.

ROBERTSON MATTHEWS

ACCORDING to Sir Henry Maybury, during nine months three of the most important British "tube" companies had a decrease in passenger receipts of £122,000, and a decrease in passengers carried of 6,000,000, while during the same period motor bus receipts increased £400,000 and the number of passengers carried by motor buses by 100,000,000.

Italy Becoming Good Market for American Cars of Medium-Price Group

Imports during 1925 show big gain over 1924, with U. S. cars first in value and second in numbers. Most domestic cars too high priced.

IMPORTS of automobiles into Italy have been relatively small in the past but records for the first seven months of 1925, published in *Official Monitor and Industry* show that the demand for foreign built cars of the medium price group is increasing to a large extent.

Imports for this period totaled 2377 units valued at 23,816,000 lira as compared with 1648 units valued at 18,523,000 lira imported during all of 1924. Nearly half of all cars imported, or 1192, are in the medium price group weighing 900 and 1600 kilos (1980 to 3520 lb.).

This increase is especially significant because several foreign manufacturers building cars of this particular type have established Italian plants. This signifies a change in the buying habits of the Italian population. Heretofore motor cars have been considered luxuries and automobile owners have been confined almost exclusively to the wealthy classes. Now, however, cars are becoming an every-day means of transportation and the middle classes are providing a constantly growing clientele for automobile dealers.

Few Medium Priced Cars Built

The type of car popular in Italy and the class of persons which has bought automobiles in the past is well evidenced by comparing the value of Italian imports and exports. The average value of exported cars in the medium weight group is 23,000 lira while that of imported cars is only 11,000 lira. Medium priced cars have not had a market in Italy before so that there is no well developed domestic production to care for the recent demand for this type car.

One important element tending to retard Italian imports is the high protective tariff which has been levied since 1921. A double duty is applied to all foreign vehicles—one being based on weight and the other on value. Following are the rates on the weight basis:

Weight	Duty in gold lire per 220 lb. weight
Vehicles up to 880 lb.	220
From 880 to 1980 lb.	115
From 1980 to 3520 lb.	65
From 3520 to 5500 lb.	75
From 5500 to 8800 lb.	95
Over 8800 lb.	60

On automobiles with or without body weighing up to 5500 lb. there is levied in addition a surtax or 35 per cent *ad valorem*. The duty in gold lira is paid in paper lira according to the rate of exchange fixed each week by the Minister of the Treasury.

A foreign vehicle of the touring car type weighing 2200 lb. and listed at \$1000 would pay a weight duty of about \$125 and an *ad valorem* duty of \$350, making the total duty about \$475 which must be added to the f.o.b. factory price in addition to transportation, insurance, commission and other charges.

An investigation made in 1922 showed the output of Italian factories to be about 19,000 cars per year. This

must be considered too small at present because Italian exports during the last four years have been at a rate of over 15,000 per year with imports at little over 1000 per year while the number of cars in service has increased from 17,140 in 1913 to 61,831 in 1924. Much of this increase must have taken place since the war.

Industry Depends on Exports

Italian automobile production has been maintained by exports. Home use of cars has been retarded by poor roads, especially in the southern part of the country, high taxes and high cost of fuel. While waiting for these obstacles to disappear Italian manufacturers have increased their sales efforts in foreign countries with excellent results. In this they have been helped by the depreciation of the lira which has substantially the same effect as an export bonus on their products.

Following are import and export figures for 1922, 1923, 1924 and the first seven months of 1925:

IMPORTS		
Year	Number of Units	Value (Lira)
1922	336	7,095,000
1923	918	11,509,000
1924	1,648	18,523,000
1925	2,377	23,816,000 (7 mos.)
EXPORTS		
Year	Number of Units	Value (Lira)
1922	11,372	276,643,000
1923	12,750	287,554,000
1924	18,933	337,570,000
1925	17,596	394,123,000 (7 mos.)

The average value of all exported cars is about 21,000 lira, while that of all imported cars is about 11,000 lira. This shows that while high price cars are made in and exported from Italy, imports consist mainly of lower priced cars which can compete in price with domestic vehicles in spite of the high tariff duties.

Origin of the cars imported into Italy during the first seven months of 1925 were as follows:

Country	Number	Value (Lira)
United States	1,138	13,526,629
France	1,156	8,548,119
Germany	46	1,111,649
Austria	16	393,100
Miscellaneous	21	.....
	2,377	

Test Chamber Temperatures

IN the report of the Research Session of the recent Annual S. A. E. Meeting at Detroit, on page 191, February 4 issue, reference was made to the paper by D. M. Pierson on "An Improved Type of Refrigerated Test Chamber" and Mr. Pierson was mentioned as saying that tests in the refrigerated chamber were carried out under temperatures as low as 40 deg. Fahr. This was obviously an error. The temperature at which the tests are usually conducted is 20 deg. below zero, Fahr.

for December, 1925

Canadian Exports

ELECTRIC VEHICLES		PARTS				TIRES				PASSENGER CARS						TRUCKS				PARTS		COUNTRIES
No.	Value	Value	No.	Value	No.	Value	No.	Value	Up to \$500		\$500 to \$1,000		Over \$1,000		No.	Value	Value					
		\$2,290	200	\$5,492	65	\$107	106	\$9,530														
		1,555																				
		470,940	1,195	33,402	1,429	5,892	5	575				14	\$12,419	14	\$20,567		\$63,436	Austria				
		465	10	210														Belgium				
		1,352	705	18,281	889	2,846	272	18,395										Bulgaria				
		548,461	815	17,184	795	2,949	32	703										Czechoslovakia				
		294	20	1,557	18	190												Denmark				
		5,659	677	13,148	784	2,459												Estonia				
		286,465	2,038	35,883	772	3,098												Finland				
		47,232	1,850	82,591	1,376	6,347												France				
		128																Germany				
		12,197	205	3,580	206	356												Gibraltar				
		3,537																Greece				
		175	114	1,864	115	286												Hungary				
		141,099	30	438	418	1,644												Iceland and Faroe Islands				
		171																Italy				
		926																Latvia				
		91,927	1,262	29,538	1,225	4,805												Malta, Gazo and Cyprus Is				
		8,250	113	2,836	86	454												Netherlands				
		149	217	5,776	120	413												Norway				
		7,385	280	14,376	294	724												Poland and Danzig				
		10,106																Portugal				
		30,458	245	9,200	487	2,945												Romania				
		339,993	2,315	45,557	1,857	6,076	421	16,417										Russia				
		83,514	2,328	51,099	2,102	6,278	161	12,515										Spain				
		6,639	738	23,579	1,178	4,526												Sweden				
		2,006																Switzerland				
																		Turkey				
																		Ukraine				
																		United Kingdom				
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																		Newfoundland				
																		Barbados				
																		Jamaica				
																		Trinidad and Tobago				
																		Other British West Indies				
																		Cuba				
																		Dominican Republic				
																		French West Indies				
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Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

Outlook Good in Spain

THE current year should be the best in history for the American automobile manufacturers in Spain on account of superior organization and new financial arrangements beneficial to the dealer and buyer. The only unfavorable feature is the promotion of national automobile manufacturing by recent Government decrees.

Bulgarian Imports

DURING 1924 Bulgaria imported 134 automobiles valued at 17 million leva, of which 29, valued at 3 million leva were imported from France. During 1923 the country imported only 66 cars, valued at 6 million leva, of which 9 were from France. During 1923 39 trucks were imported; during 1924, 99. It will be noticed that the importation of automobiles more than doubled in 1924. Italy occupies the premier position in the Bulgarian market.

Russians to Build Cars

THE Russian Information Bureau has informed the Automotive Division of the Department of Commerce that a passenger automobile corporation capable of turning out between 3,000 and 5,000 cars annually will be formed at Leningrad within the next few months. The output will be limited at the outset to cars assembled from imported parts. Building of motor trucks, say the same authority, already has been organized and during the first three years 2,535 trucks of 1½ and 3-ton capacity will be turned out at Soviet factories.

Road Project for Mexico

ANOTHER large road building project for Mexico has been formulated with excellent chances of materializing in 1926. Senor Carlos Alarcon is the promoter, and is stated to have interested two American construction companies. The main roadway would run from Columbus, New Mexico, through Chihuahua, Durango, and Aguascalientes to Toluca, capital of the State of Mexico, whence there is a good road to Mexico City. Senor Alarcon is said to have concessions from the governors of all the states through which the road would pass. Each governor is to have some shares in the company owning the concession. Contracts with the state governments provide that 10 per cent of the annual state revenues, as well as a special gasoline tax of 2 centavos a liter, will be devoted to the road fund.

Restrictions on Kauri Gum

THE Kauri Gum Control Act, enacted by the New Zealand Parliament for the control of the Kauri gum industry by a board clothed with power to direct the marketing comes into force April 1, 1926. The control board of five members is empowered to prohibit the export of Kauri gum except under license, to assume control of all Kauri gum produced in New Zealand, and gum thus controlled may only be sold or disposed of by direction

of the board. The principal use of the gum is as an important ingredient in the manufacture of fine varnishes and enamels, notably those used in the finish of motor car bodies, and while Kauri gum enjoys a high standing it enters into open competition with many other kinds and grades of gums from other parts of the world, and recently with synthetic preparations.

Gas Tax in Nova Scotia

THE proposed tax of 3 cents per imperial gallon (1.2009 United States gallons) on gasoline in the Province of Nova Scotia became effective on January 1. The tax will be collected by wholesalers on all gasoline sold, but rebates will be allowed consumers on gasoline used for purposes other than the operation of motor vehicles.

New Peruvian Decree

AUTOMOBILES, motor trucks and other vehicles imported into Peru, the Automotive Division of the Department of Commerce is informed, will not be entered in the custom house for clearance but are to be despatched directly from the dock or beach, according to a Peruvian decree recently effective. The purpose of this measure is reported to save storage space in the custom house.

Canadian Market Improves

AN optimistic forecast for the sale of American automotive products in the Canadian market this year is contained in a business analysis just compiled by the Department of Commerce. The general outlook is better than it has been since 1920, and the period of depression which commenced in the following year appears to be definitely at an end, according to Trade Commissioner L. W. Meekins at Ottawa. An examination of Canadian manufacturing industries reveals special strength in the manufacture of automobiles and rubber goods, according to the report.

Holland Import Figures

A COMPARISON of the automobile and truck imports of Holland for the first nine months of 1924 and 1925, respectively, is made in the following two tables:

	1925		1924	
	COMPLETE No.	Value in 1000 guilders	No.	Value in 1000 guilders
Belgium	3,895	\$6,719	3,041	\$4,705
United States	2,035	6,638	1,385	4,930
France	1,406	3,394	940	2,519
Total	8,153	19,296	10,832	16,424
	CHASSIS			
	No.	Value in 1000 guilders	No.	Value in 1000 guilders
Belgium	3,620	\$3,690	4,143	\$3,924
France	286	1,031	296	985
Total	4,335	6,130	4,831	6,915

The imports from Belgium seem entirely out of proportion with the importance of the Belgian industry, and the large figures probably are to be accounted for by re-exports of imported French cars and cars assembled in Belgium from American parts.

Automobile of Tomorrow is Pictured for Cleveland Section, S. A. E.

Cars of future to be of lighter construction with two-cycle constant compression engines, automatic transmissions, drop base tire rims and steam cooling systems, says Herbert Chase.

FURTHER use of developments in lacquer finishes, considerable reduction in weight, partly through use of a type of flexible body, employment of some sort of two-cycle constant compression engine, much improved riding qualities, utilization of steam cooling of drop base tire rims and of some type of automatic transmission were among the possible characteristics of the automobile of the future as outlined by Herbert Chase, of the Erickson Co., in his paper, "Automobiles of Today and Tomorrow," read before the Cleveland Section of the Society of Automotive Engineers, Feb. 15.

Stressing the engineering as well as the sales importance of recent developments in lacquer finishes and predicting even further advances in the next few years, Mr. Chase went on to suggest specific possibilities for improvement in clutches, chassis lubrication and other phases of design.

Nitrocellulose Undercoats

In regard to body finishing, of which he has made a study for several years, he said that nitrocellulose lacquers have worked a revolution in this art and are today used as the finishing coats of all cars with the exception of those at the extreme ends of the price scale. Many cars now also have undercoats of a nitrocellulose base, as it has been found possible to give such coats the same adhesive qualities as those of an oxidizing oil base, while the nitrocellulose undercoat is more durable and dries more quickly. All of the lacquer base undercoats can be applied in one day, and the body can remain on the production line without being shunted through drying ovens between coats.

Many of the finest bodies at the recent Grand Central Palace show and more than 90 per cent of those at the Salon still had a varnish finish, which indicates that the purchasers of high-priced cars still demand the depth of lustre characteristic of that class of finish and which cannot be equaled as yet with lacquer on a commercial basis he pointed out.

High-grade lacquers after drying are not very glossy and if gum is added in excess to increase the gloss, durability is sacrificed. By polishing the final coat of lacquer both gloss and durability are obtained, but the shine is all "on the surface" and there is no depth of lustre. To get this lustre some firms apply two coats of finishing varnish on lacquer undercoats of Nitro Valspar.

One question naturally arises at this point: Why not use a clear lacquer to give depth of lustre over lacquer enamels such as now form the final coats of all-lacquer finishes?

There are two reasons: First, lacquer coats are exceedingly thin, only a small fraction of the thickness of varnish coats; hence, many coats are required to give the true physical depth necessary to match varnish lustre. This

would make cost excessive. Second, transparent films of lacquer, which may give good service if used indoors, are attacked when exposed to the ultra-violet rays of sunlight and disintegrate comparatively fast, whereas, when mixed with pigment as in a lacquer enamel, the light is excluded and an extremely durable product results, providing, of course, the remaining ingredients are such as to give sufficient flexibility and the other qualities required.

It is very desirable that body weights should be reduced, because a lighter body is a pre-requisite to a lighter chassis. Some attempts to build lighter and more flexible bodies have been made abroad, evidently with a fair degree of success, but indications are that the American buying public would not accept the type of coachwork which characterizes these bodies. In this connection it should be remembered that most of the materials entering into automobiles are bought on a weight basis and materials account for from 75 to 90 per cent of the cost of production, hence there is little chance for further cutting down production costs by reducing the labor item, whereas an important saving could be made if the material required could be reduced by one-half, for instance.

Bodies could be made lighter if by some form of flexible suspension they were protected against strains due to weaving and vibration of the frame. In one Velie body a flexible support is used under the windshield pillar, while in England a pneumatic cushion has been used. A substitute for glass, flexible, non-shatterable and equally transparent, would make possible an important saving in weight. Research is being conducted along these lines.

Movable Back Rests

Back rests on seats which move up and down with the passenger have given excellent satisfaction on the Chrysler roadster and are worthy of more extended use. Adjustable driver's seats tend to add to comfort in driving and toward greater safety. More attention should be given to the problems of ventilating and heating closed cars, and the use of steam radiators, referred to later, are a promising answer to the heating problem.

Leather upholstery for closed cars would be easier to keep clean; both the genuine and the imitation article are now made with a "feel" like fabric, but there is room for further improvement.

Certain engineers feel that the increase in engine speeds in recent years has not been without its adverse effects, in decreasing engine life. Other things being equal, a lower speed engine will show less vibration and less frictional losses, and it is likely to wear longer.

The two-cycle engine has lost caste, as it were, and is seldom mentioned in automotive circles any more, but Mr. Chase said he ventured to predict that some form

of constant compression engine would yet command attention, and it was as likely to be a two-stroke as a four-stroke engine. Some way, he said, would be found to improve materially upon the very low economy of the present type of engine under conditions of small load, which conditions prevail 80 per cent of the time.

Steam Cooling Systems

After referring to the introduction of oil filters, oil stills and air cleaners in recent years, Mr. Chase went on to a discussion of steam cooling systems for which he claimed the following major advantages:

1. Smaller, lighter, cheaper and practically non-freezable radiator.
2. Rapid warming of engine and constant temperature of jacket thereafter, regardless of load.
3. Relatively slow cooling when engine is stopped.
4. Elimination of thermostats, shutters, and supplementary tanks for catching solution boiled out of radiator.
5. Substantial elimination of fuel and water contamination of crankcase oil.
6. Heating of bodies by use of steam radiators.
7. Virtual elimination of overheating such as is common with ordinary water systems when long, hard pulling is encountered.
8. Approximate elimination of the loss of cooling solution, even with leaky radiator core.
9. Convenient piping of small diameter for entire system of cooling and heating, jacket outlet pipe excepted.
10. Increase in fuel economy.

Chassis changes are less likely to be of a radical character than those in engine design. Frames are being built constantly more rigid, and there is a possibility that in the future frames will be built up of tubular instead of channel sections. Somebody may yet design a torque multiplying device of continuous and infinitely variable torque characteristics, but to replace the present transmission it must be as inexpensive, compact, simple and servicable as the latter, and that is a large order.

Clutches have been improved in various ways; they are now easier to operate, longer-lived and with less spinning weight than formerly, and more gradual engagement is the rule.

There have been few changes in rear axle design in recent years, one of the outstanding ones being the adoption of the underslung worm drive by Stutz, partly because it permits of lowering the chassis. Aside from this single instance the spiral bevel drive dominates the field. Straddle mounting of the pinion is becoming more popular. A promising form of self-locking differential has been developed by C. Andrede.

New Brake on Stutz

Four-wheel brakes apparently have come to stay, yet Dodge, Reo, Franklin and Lincoln are doing without them successfully in the face of strenuous competition—a fact which indicates that they are not essential, though they have certain well-recognized advantages. Timken's hydraulic brake, adopted by Stutz, constitutes one of the few recent departures and has the advantages of simplicity, uniform distribution of pressure and long arc of contact. Much interest is being evinced in the revival of the vacuum-operated brake.

Riding qualities have been greatly improved, by the provision of better springs and the adoption of balloon tires. Designs in which the axles are replaced by cross springs have given some promise and deserve further investigation. Not all the possibilities of pneumatic

suspensions have been exhausted, and the introduction of non-metallic shackles in more designs seems quite likely.

The ideal car from the owner-driver's standpoint is one which will keep running with next to no attention, and a long step in this direction was made with the introduction of the centralized chassis lubricating system. Mr. Chase said he looked for the general adoption of such systems in the near future, at least on all higher-priced chassis.

Front axles and steering gears have undergone numerous refinements, chiefly as a result of problems arising out of the introduction of front wheel brakes and balloon tires. The latter are now used on practically all cars except a few of the largest and heaviest, and are here to stay. They have certainly added to the comfort and probably also to the safety of cars.

Disk wheels have gained much in popularity and are likely to continue to do so, if for no other reason than the failing supply of wood suitable for wood wheels. Drop base rims have certain advantages with respect to ease of tire changing which the public seems as yet to fail to recognize; but if it ever realizes these advantages these rims are likely to come into use with as much of a rush as balloon tires did.

Financing Sales in Germany

At a recent general meeting of the German Automobile Dealers Association, the Secretary, Johannes Buschmann, said the only way to increase sales of automobiles in Germany, and thereby to increase the prosperity of the automobile industry, is to properly finance sales. He denied that the present crisis in the German automobile industry was due to the lifting of the embargo and said the automobile industry was no worse off than any other German industry. Imports of foreign cars during the first eight months of the year had amounted to 8,331, and if they continued at the same rate during the rest of the year, the total imports would be about 12,000 cars, which at an average of \$1,000 per car would amount to 50,000,000 marks and not 100,000,000 or even 500,000 000 marks, as had been stated.

Several finance corporations had recently started business in Germany, he said. Lehner & Co. in Berlin asked a down payment of 25 per cent and gave 12 months' credit on notes with dealer's endorsement, the expense to the buyer figuring out to 35 per cent per annum. The Motor Credit Bank in Munich offered similar terms, the expense to the buyer amounting, according to its own statement, to 30 per cent. The Amstee had five different time payment plans. The standard plan involved a down payment of 25 per cent and 12 monthly notes. No risks were assumed by the dealer, who was not asked to endorse the notes. Although it was an advantage to the dealer not to run any risks, the interest, which amounted to 79.5 per cent per annum, was much too high.

Mr. Buschmann pointed out that in other countries the cost of credit is much lower, in some cases only 14 per cent per annum. The General Motors Corp., which does the financing itself, asks 16.6 per cent. Mention was also made of another finance institution which would be ready to start business in about two weeks, the Industrial Guarantee Co., Berlin, which was already conducting financing operations successfully in several countries. It was a stock company with a capital of 100,000 marks, which had available 5,000,000 Swiss francs. The cost, on a yearly basis would be 24 per cent.

EDITORIAL

A. Y. D. vs. F. O. B.

ABOLITION of the factory list price and substitution of zone delivered prices—termed by Hudson a.y.d. (at your door) prices—is the latest merchandising move in the industry. The new practice, put into operation by two companies, accomplishes at least two things:

1. It permits factory as well as local advertising to record for the prospective purchaser what he will have to pay for the car, rather than the base upon which \$100 or \$200 of extra charges are to be built.

2. It tends to limit the extra charges which may be added by the dealer to the price at which he buys the car from the factory.

Dealers more than once have been heard to express a desire for a plan of this kind; particularly have retailers out on the Pacific Coast voiced their opposition to the advertising on the Coast of an f.o.b. Detroit price and in favor of a Pacific Coast delivered price. So long as the price established is sufficiently high to cover adequately the cost of freight and handling charges, the delivered price plan would seem likely to meet with dealer approval. From the standpoint of the prospective purchaser the idea seems to be psychologically sound.

Whether the advantages of a.y.d. over f.o.b. are such as to result in its adoption by more manufacturers as time goes on remains to be seen. We'd be glad to get opinions on the subject from readers.

Equipment Sales and Production

IT is to be expected that sales of original equipment to car makers will correspond fairly well to vehicle output, although a general consideration of the matter would lead to the belief that the correspondence might not be very close at certain periods.

In 1925 the trend of the vehicle production and the original equipment sales curves, compiled on an index basis, was extremely close for about ten months, wide discrepancy appearing only in August, when output dropped sharply, due to Ford's production difficulties with his new models. This statement is based on curves drawn with January, 1925, in both cases assumed to be 100 per cent, the original equipment curve used being that of the Motor & Accessory Manufacturers' Association.

In the early months of the year, the production curve ran slightly ahead of the original equipment curve, but in April, May, June and July the two were almost exactly the same. Then came the August divergence already mentioned. In September both curves started up, the original equipment leading by a fair margin. By November approximate coincidence again had been achieved, with production falling

slightly below again in the last month.

The close correlation of these two lines for 1925 does not mean that a similar proximity always can be expected, as uneven economic conditions probably would cause variable fluctuations in the two curves. The 1925 experience does seem to indicate, however, that in times of continued business stability original equipment sales and vehicle production tend to preserve a fixed relationship to one another.

Form or Effectiveness?

ASKED to talk before the Automotive Manufacturers Association recently on the subject "The Kind of Jobbers That Give Us Best Distribution of Shop Equipment," C. F. Hodgson, Weaver Mfg. Co., started out with the following statement:

"In our experience of 14 or 15 years in trying to merchandise shop equipment . . . I fail to find that an analysis of what might be termed the most successful distributors of our line of equipment tends to point to any one particular class or type of jobber. On the other hand, our sales records seem to point conclusively to the fact that the passing years have simply accented the time honored theory of the survival of the fittest as applied to the ability of the individual institution to cope with the succession of problems which have naturally resulted from the very rapid development of the automotive industry as a whole."

Mr. Hodgson's statement emphasizes again the thought that the efficiency of operation of a particular method in distribution usually is more important than the type of method itself. The future seems likely to see more emphasis of effective operation and less on forms *per se*.

Proving Grounds Increase

EVERY year automobile designs are nearer to a state of perfection when put into hands of the public than they were the previous year. Ex-president Horning, of the S.A.E., once made a quip to the effect that after a feature of design had been in use for two years it then became an engineering problem and came up for widespread discussion among the technical men. The industry is far less open to that criticism today than it was five years ago.

Proving grounds are increasing in number, Packard and Studebaker being the latest companies to put such practical laboratories into operation. No longer is the public expected to do the experimental work on a new automobile design. Competition has become too keen to permit a product to go on the market without the most thorough tests previous to its announcement.

AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania

Thursday, February 25, 1926

Production Gain Continues; March May Set New Record

PHILADELPHIA, Feb. 25—No substantial change in the automotive situation was noted this week. Excellent sales, above normal for the season of year, continue in cars, trucks, parts and accessories, as well as in the export markets for these products. Production is being gradually stepped up, and schedules laid out for March indicate that that month will show one of the highest totals the industry has ever reached, if it does not, in fact, set a new all-time record.

The price situation seems to be more nearly stabilized than at any period during the last eight or ten months, which is always a favorable market influence as well as a source of security and confidence for both manufacturers and dealers. With f.o.b. lists well established, sales departments of several of the large factories have given greater attention to delivered prices, and a movement is apparently under way to advertise to buyers the local cost of the car rather than the factory price.

Dealers' Stocks Down

The fact that demand has quickened faster than it usually does in the early months of the year has served to hold down dealers' stocks. A computation based on the best available figures indicates that stocks as of January 1, 1926, were 134,000 greater than at the corresponding date a year ago, when cars held by dealers were at an unusually low point. Additions to these stocks have undoubtedly been made since the first of the year, but, in view of the excellent retail demand, not nearly to the extent that the high production figures might seem to indicate.

Financial reports of leading automotive companies now being issued and covering the year 1925 show clearly the prosperous state of the industry and the strong reserves it holds against unforeseen developments.

Mexico Could Furnish Abundant Rubber to U. S.

WASHINGTON, Feb. 25—Establishment of a gigantic rubber industry to supply the United States in Mexico would be entirely feasible, according to a report just made to the Department of Commerce by Commercial Attache Alexander Dye.

Corporate Name Changed

MILWAUKEE, Feb. 24—The A. B. & B. Sheet Metal Works, manufacturer of automotive sheet metal parts, including fenders, hoods and tanks, has changed its corporate name to Scolper Steel Products Corp. An addition to the factory will be made in April, company officials said.

G.M. Report Shows 1925 Biggest Year

Net Earnings, \$116,016,277—
Sales Jump 13.10% Over
Former Record

NEW YORK, Feb. 24—General Motors Corp. in 1925 enjoyed by far its most successful year and January has begun 1926 with both dealers' sales to consumers and division sales to dealers doubling the figures of January, 1925.

Last year net earnings were \$116,016,277, which includes \$9,531,521 as the corporation's proportion of subsidiary operations not consolidated but accruing to G. M. in excess of dividends received. These results, according to the annual report issued today, \$106,848,756 net earnings reflected directly in G. M. consolidated income account and balance sheet. This is 71.56 per cent in excess of the previous high record of 1923 when net was \$62,067,526.

Sales Set Record

The total of 827,056 cars sold at retail at home and abroad in 1925 topped all previous records by 95,775 or 13.10 per cent. These sales, excluding all inter-company items, amounted to \$734,592,592. Stocks in the hands of the corporation and its dealers and distributors at the end of the year were moderate and no more than sufficient to meet current retail demand. The corporation's policy regarding stocking dealers has been rigidly adhered to with profit both to the dealer organization and the corporation itself, says the statement to stockholders by Pierre S. duPont, chairman, and Alfred P. Sloan, Jr., president.

After paying regular quarterly dividends on preferred and debenture stocks, requiring \$7,639,991 from the net earnings, there remained \$108,376,286, or \$21 per share on the common, another new high record for the corporation. Excluding G. M. share of the equity earned by subsidiary operations not included in the G. M. consolidated statement, there remained \$98,844,765 earned on common or

\$19.15 per share for the year 1925.

At the end of 1925, cash in banks, Government securities, temporary loans and marketable securities amounted to \$145,142,088, against \$88,059,016 on Dec. 31, 1924. Total current assets were \$290,869,088 and liabilities \$109,042,207. The \$181,926,881 excess of assets over liabilities compares with \$161,105,281 as of Dec. 31, 1924, an increase of \$20,721,600, while surplus increased \$36,909,544 to \$119,020,473.

The fact that total real estate, plant and equipment accounts show substantially the same as 1924 means that expenditures on account of additions and improvements were of comparatively small amount and have been offset by liquidation and charge-offs against operations. Reserves for real estate, plant

(Continued on page 391)

M. & A.M.A. Reports Big Trade Volume

Domestic and Foreign Business
Register Improvement
Over 1925

NEW YORK, Feb. 25—Business of automotive parts and accessory manufacturers got under way for 1926 with tremendous volume. According to the Motor and Accessory Manufacturers Association, with members in all the principal production centers of the industry, January shipments from factories were one-third greater than in the first month of 1925, and has been proceeding at a strong pace throughout February.

The M. & A. M. A. Business Bulletin, just issued to members, gives a consolidated report of a large and representative group of manufacturers showing January shipments in all divisions 132 per cent of January, 1925. As compared with the first month of last year, January shipment of parts and accessories for original equipment on cars and trucks aggregated 137 per cent, and shipments to the wholesale and retail trade aggregated 103 per cent in replacement parts, 127 per cent in accessories and 115 per cent service equipment.

The original equipment index of 137 per cent was almost identical with the car and truck production index, which was 138 per cent of January, 1925.

The M. & A. M. A. bulletin showed jobbers' sales throughout the United States and Canada considerably in excess of those of a year ago. A summary of automotive foreign trade shows gains for 1925 over 1924, ranging from 25 to 100 per cent in different divisions.

Tax Cut Bill Passed by House and Senate

Automobile Relief Aggregates
\$80,400,000—Probably
Effective April 1

WASHINGTON, Feb. 25—The new revenue bill, with automobile tax relief aggregating \$80,400,000, goes to President Coolidge today, having passed both House and Senate this week. The bill as passed was in form the result of the House and Senate conference agreement reached Feb. 19.

This means that 30 days after the bill becomes law, or probably before April 1, the Government will collect 3 per cent instead of 5 per cent tax on passenger cars sold.

Under the administrative features of the bill the Government continues to collect for 30 days after the bill passes, the old 5 per cent on all passenger cars sold. At the end of this 30-day period the Government will rebate to dealers the difference between 3 and 5 per cent on all cars in stock.

The tax on trucks, tires and accessories becomes effective immediately on passage of the measure. The administrative features of the bill do not provide for any rebate for such stock on hand and make no provision for adjustment as between the manufacturer and the dealer, this being a matter for their own private agreement.

Producers See End of Car Taxes Near

NEW YORK, Feb. 24—Retention by Congress of the 3 per cent war excise tax on passenger automobiles, including tires, parts and accessories sold as original equipment, has given rise to the erroneous report that car manufacturers through the National Automobile Chamber of Commerce would continue to fight this tax in the present session of Congress. This report is untrue because the manufacturers some time ago reached an agreement with Congress on the reduction of the passenger car tax from 5 to 3 per cent with elimination of the tax on trucks and tires not sold as original equipment, and the manufacturers have no intention of breaking that agreement.

Justice of Plea Seen

Alfred Reeves, general manager of the N. A. C. C., returning from Washington today, said that the 2 per cent reduction meant that Congress had recognized the justice of the manufacturers' plea and the beginning of complete elimination of the passenger car tax. He expects that Congress itself will take the initiative toward complete elimination in the not distant future, but the N. A. C. C. believes that the present tax

bill gives the automobile industry fair consideration.

The manufacturers' agreement with the public to pass on to the consumer the passenger car tax reduction is expected to mean a reduction in delivered prices averaging between \$11 and \$12. This is based on the \$29 which was estimated as the average difference in price which would have been represented by elimination of the whole 5 per cent tax. When tire makers in January increased the price of original tire equipment it was feared that this increase would at least balance the promised car price reduction, but at the N. A. C. C. today it was said that manufacturers, if necessary, would probably take the loss in order to keep their agreement to pass the tax reduction along to the consumer.

Crude Rubber Makes New Low for Year

NEW YORK, Feb. 24—Crude rubber prices, tending downward since Jan. 1, yesterday fell to 57 cents for spot smoked sheets, a new low for the year, and F. R. Henderson, president of the Rubber Exchange of America, Inc., attributes the decline almost wholly to the larger use of reclaimed rubber and the abolishing of shipping tires in winter months for payment in the spring.

These factors, he says, have materially reduced actual consumption of crude during the last three months, the consequent surplus of arrivals having brought stock on hand to a more satisfactory position. Sudden liquidation of long accounts in London, where stocks on hand have been declining, have assisted in creating a more depressing effect than was anticipated.

Locke Buys, Moves Plant

ROCHESTER, N. Y., Feb. 24—Locke and Co., automobile body manufacturer of Detroit, has purchased the old Symington gun factory here and will remove its plant to this city. Remodeling the old plant is proceeding rapidly. Shipments of machinery to be installed in the remodeled plant have already arrived.

The factory will be in direct charge of Newton H. Manning, formerly of Rolls-Royce of America, Inc., and now vice-president and general manager of the Locke concern. Charles M. Fleischman, of New York, is president.

Luncheon for Schmidt

NEW YORK, Feb. 25—Walton Schmidt, field representative of the National Automobile Chamber of Commerce, was guest of honor at a farewell luncheon tendered to him by the Chamber staff at the Columbia University Club today. Mr. Schmidt leaves tomorrow to visit Australia on the invitation of automotive associations and has also been invited to visit several other countries in the Far East.

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Feb. 25—Trade in general continues at a level approximating or somewhat exceeding that of a year ago. No marked change was apparent last week, although confidence was apparently strengthened by the termination of the anthracite strike. More activity was reported in wholesale business than in retail trade or manufacturing. The level of wholesale commodity prices declined rather sharply.

PRODUCTION INCREASES

Increases were reported to the Department of Commerce for last month in production of pig iron, steel ingots, zinc and northern pine lumber, and in consumption of tin and silk and shipments of locomotives, while the production of Douglas fir lumber declined.

CAR LOADINGS

Car loadings in the week ended Feb. 6 numbered 914,904, as against 925,263 a week earlier, and 929,130 a year ago. Loadings for the year to date total 5,346,914, as compared with 5,386,079 in the corresponding period of 1925.

FOREIGN TRADE

Exports last month, according to the preliminary estimate, had a value of \$399,000,000 and imports of \$414,000,000, comparing with exports of \$468,000,000 and imports of \$397,000,000 in December, and exports of \$446,000,000 and imports of \$346,000,000 in January last year. The import balance of \$15,000,000 was the first of any considerable size since the spring of 1923.

BANK DEBITS

Bank debits to individual accounts reported to the Federal Reserve Board for the week ended Feb. 17 were 5 per cent below the total of the preceding week, but 7 per cent above that of a year ago.

BUSINESS INDICES

Fisher's index of wholesale commodity prices stood at 156.6 last week, as against 158.6 a week earlier and 159.2 four weeks earlier. The commodity price index of the Bureau of Labor Statistics declined from 156.2 in December to 156.0 in January.

FEDERAL RESERVE STATEMENT

Bills and securities held by the Federal Reserve Banks increased \$7,100,000 during the week ended Feb. 17, with gains of \$5,000,000 in discounts, \$1,100,000 in open market purchases and \$1,300,000 in government securities. Note circulation declined \$6,700,000, while deposits increased \$30,400,000 and reserves \$900,000. The reserve ratio declined from 74.2 to 73.7 per cent.

MONEY

The range of call loan rates was from 4½ to 5½ per cent a week earlier. Time loan rates advanced slightly toward the end of the week, while rates on commercial paper were unchanged at 4 to 4½ per cent.

Car Trade's Steel Orders Are Small

Sales Managers Complain of Tardiness and Inadequacy of Fresh Business

NEW YORK, Feb. 25—Steel company sales managers complain of the tardiness and inadequacy of fresh business from the automotive industries. Some have grown cynical, and say that but a few months ago, purchasing agents of motor passenger car manufacturers painted glowing pictures of the heavy tonnages of steel they would require during the year's first quarter, which is now two-thirds gone.

Others, of a more optimistic turn of mind, say that what little in the way of reserve stocks automotive consumers had early in the year must have disappeared by now, and that, willingly or unwillingly, they must come into the market with more liberal orders and specifications from now on.

Requirements Widely Distributed

Both classes, however, overlook one development. Automotive purchasing agents consider it to their advantage to distribute their requirements over as large a number of manufacturers as possible. Just as there is much to be said for hand-to-mouth buying, which obviates the shouldering of heavy commitments or stocks, many thoughtful purchasing agents hold it to be their duty to refrain from placing all of their orders with one mill, even though by doing so they might obtain a small advantage in price. The more mills participating in their business, the more certain are they that, when shipments are urgently needed, they will not be dependent upon one source of supply. In spite of what some steel company sales managers say about automotive consumers taking too many bites of one cherry, this purchasing method seems to meet with favor by many buyers.

Market conditions are entirely unchanged. The sheet market appears to be the weakest link in the chain of steel products, with full-finished automobile sheets more steady than the other descriptions, and prices for black sheets subject to the most intensive competition among rollers for even small tonnages. Plates have also weakened. Strip steel is relatively steady.

The Metal Markets

Pig Iron—A month ago automotive foundries considered it good policy to await the ending of the anthracite coal miners' strike, and the consequent removal of pressure on the coke supply from domestic consumers before entering the pig iron market. Now that the strike is out of the way, they can see no special reason why they should be in any hurry to cover forward requirements. The market, therefore, rules dull.

Aluminum—Strictly routine conditions

prevail in the aluminum market. Demand for metal for casting is normal, but that for sheets light.

Copper—Producers are not letting any metal go below 14½ cents. Demand for automotive brasses is fair.

Tin—Heavy American demand continues to be responsible for a continuance of high price levels in London. British consumption is also relatively high.

Lead—The recent slight decline in lead was interpreted by many consumers as the signal for further declines which may or may not materialize, but meanwhile consumers are holding aloof.

Zinc—Slightly steadier, with considerable of the demand so far uncovered.

Federal Road Bill Approved by House

WASHINGTON, Feb. 25—"There can be no question about the attitude of the general public toward continued highway improvement," H. H. Rice of the National Automobile Chamber of Commerce informed the House Committee on Roads holding hearings on the Dowell Federal-aid bill when he testified here this week.

"The mere fact that there are 20,000,000 motor vehicles on the streets and highways of the Nation today," continued Mr. Rice, "constitutes a straw vote of tremendous significance. The people of this country are purchasing individual transportation just as they purchase any other commodity which is of vital importance to their well-being and happiness."

The committee late yesterday, following Mr. Rice's appeal for adequate funds, voted to report favorably the Dowell bill, authorizing expenditures of \$75,000,000 in 1928 and a like amount in 1929 for Federal highway aid. In addition the bill authorizes \$7,500,000 for forest roads in each of the two years.

Illinois New Car Sales Gain 111% Over December

CHICAGO, Feb. 24—The influence of the show season on the registration of new passenger cars is reflected in the showing made in Illinois during January, where a gain of 111 per cent in total, as compared with December, was recorded.

All price divisions were up, the greatest advance taking place in the low-priced group (excluding Fords), with a jump of 174 per cent. Medium-priced cars scored a gain of 147 per cent; high-priced vehicles were up 66 per cent, while Fords were 46 per cent ahead of December.

Following are the detailed figures for the first month of 1926:

Fords	Low priced excl. Fords	Medium	High*	Total
3,317	3,093	6,846	1,015	14,271

* Includes miscellaneous cars not named.

Durant Still Active in Motor Companies

Report of Retirement Denied—Plans Soon to Return to Desk

NEW YORK, Feb. 21—C. F. Daly, vice-president, Durant Motors, Inc., denies unequivocally the newspaper report that William C. Durant has retired from active participation in the automotive concerns which he formed.

The report stated that Mr. Durant planned to retain his stock and bond interests but that active direction had passed to the hands of others. Mr. Daly told a representative of the Chilton Class Journal Co. that there was no truth whatever in this report, and that Mr. Durant, having recovered from injuries sustained in a train wreck in Florida recently, expected to be back at his desk after Washington's Birthday.

Injuries Were Serious

It was learned that Mr. Durant's injury was more severe than was at first supposed. It is understood that the collision threw him against a washstand, inflicting a gash in his forehead, and it is said that the stitches taken in Florida had to be replaced after he was brought to New York. Mr. Daly said that Mr. Durant would have returned to his executive work before this except that he did not care to work with "a turban around his head."

Mr. Daly pointed out that the published statement that C. O. Miniger, president of the Electric Auto-Lite Co., had been made chairman of the finance committee of the Flint Motor Car Co. was not news and added that there had been no important executive changes in the Durant, Flint and Star organizations recently.

Compulsory Insurance on Automobiles Opposed

TRENTON, N. J., Feb. 25—Automotive interests are opposing a bill in the New Jersey legislature for compulsory automobile liability insurance. Henry Pilch of Newark told the legislative committee that the bill would increase the number of accidents and of careless and incompetent drivers, on the theory that in the event of accident the company would pay, and he also opposed the bill as the entering wedge for a state insurance system.

Prest-O-Lite Buys Land

NEW YORK, Feb. 23—The engineering department of the Prest-O-Lite branch here has confirmed the report that the company has bought some additional land in Atlanta, Ga. It is believed that plant additions are contemplated there in the not distant future. Officials of the company refuse to make any further announcement at this time regarding plans.

Akron Tire Output Declines Slightly

100,000 a Day Produced—Gain in Next Few Weeks is Anticipated

AKRON, Feb. 24—Production of automobile tires again declined slightly last week in the Akron district, as a result of the lower volume of sales to dealers and automobile manufacturers.

The uncertain price situation, brought on by recent violent fluctuations in the crude rubber market, is causing dealers to buy tires on a strictly hand-to-mouth basis in most cases. Authorities do not look for any appreciable change in the situation until a big consumer demand develops with the motoring season. Continued severe winter weather has kept down the number of cars in operation.

A survey reveals that about 100,000 tires a day are now being manufactured in the Akron district, compared with about 120,000 six or eight weeks ago. Inner tube production is higher, but is still under recent levels.

Retail Business Unaffected

So far, the reduction in tire prices, announced Feb. 4, accompanied by the announcement of a policy protecting dealers against possible losses from further reductions until July 1, have had little effect in stimulating retail business. Most dealers are not in a position to finance inventories of tires which they normally carry at this season for spring and summer requirements.

Original equipment probably will begin to pick up within the next few weeks. The automobile companies, which have been turning out cars in large volume, are expected to enter the market for more tires next month. They bought tires on a big scale last December for January and February requirements, but these reserve stocks have been substantially depleted.

While there is talk in trade circles of another tire price cut, executives of the rubber companies assert they are planning no such action. A further readjustment of prices at some time in the future, however, is regarded as almost inevitable, if crude rubber continues around 60 cents a pound, or drops further.

Spot ribbed sheets registered a considerable decline again this week, making a new low price for the year, just under 60 cents a pound. Some authorities expect rubber to go to 50 cents a pound before the downward trend is halted.

Cutler-Hammer Opens Office

MILWAUKEE, Feb. 24—The Cutler-Hammer Mfg. Co., manufacturer of electric controlling devices, has opened a new sales office in the Healey Bldg., Atlanta, Ga. This office will take care of the trade in North Carolina, South Carolina,

CANADA MAY REPEAL MOTOR VEHICLE DUTY

MONTREAL, Feb. 24—If the present Government succeeds in holding office through the session and brings down the budget, prospects are that at least one reduction in duty will be made. It will be on motor cars and vehicles, which now enjoy protection of 35 per cent. Many suggestions to that effect are being received. One argument put forth is that Canadian motor factories are largely assembling plants for United States concerns, and disparity in price on two sides of the line is attributed in part to the tariff. Last year such a proposal was discussed in Government caucus, but was particularly resisted by two Liberal members representing constituencies where the motor industry is very large. Both seats went strongly Conservative at the last election in October.

the eastern section of Tennessee, Georgia, Florida, southern Alabama and Mississippi. A. C. Gibson, formerly of the Philadelphia office, is in charge.

The General Machinery Co., of Birmingham, Ala., will continue to serve their trade in the northern half of Alabama.

Moon to Add \$1000 Light Six to Line

ST. LOUIS, Feb. 23—Stewart MacDonald, president of the Moon Motor Car Co., has announced that his company will start production early in the spring on a new light six automobile to sell in the \$1000 field, which will be an addition to the present Moon-Diana line.

The new car, which is smaller than the present Moon, will provide distributors and dealers with three distinct types of cars, covering a wide range of the market. According to Mr. MacDonald, the design is the result of 30 months of testing under all kinds of conditions, including those provided by the rugged topography of the Ozark mountains.

With the addition of the new light six, the company expects that its total output will exceed 25,000 in 1926, a 41 per cent increase over last year.

Zenith Business Gains

DETROIT, Feb. 18—The Zenith-Detroit Corp., manufacturer of Zenith carburetors, has announced that its equipment business for January was 14 per cent greater than in January of last year. The replacement equipment shows a gain of 26.5 per cent over the same period last year.

Ford to Make Own Upholstery Cloth

Project Includes Power Dam and Factory to Cost \$3,000,000

DETROIT, Feb. 23—The Ford Motor Co. will begin work April 15 on a huge power dam in the Huron River south of Ypsilanti, Mich., that will create a five-mile lake and change the landscape of Ypsilanti township between Ypsilanti and Rawsonville, it became known here today.

At the dam a hydro-electric power plant and auxiliary power plant will be erected to operate a \$3,000,000 factory for the manufacture of all upholstery cloth and head linings used in the manufacture of Ford cars. Last year the total cost of upholstery cloth used was \$2,225,509. Linings used cost \$3,947,855.

Now Buys From New England

The upholstery cloth and linings will be made directly from raw wool at the new factory. The company now buys most of its cloth from New England. The site of the new plant is in the center of the wool map of Michigan. The plant will be in two units, each measuring 350 x 1,000 ft. and will be completed within two years. The ground necessary for the operation covers 1,705 acres and costs approximately \$600,000.

In preparation for the creation of the five-mile lake, in which water will be backed up almost to Ypsilanti, 1,000,000 ft. of lumber have been cut in the Huron River valley, including 150,000 ft. of black walnut.

The dam and hydro-electric power plant, to cost \$1,200,000, will create 4,500 hp. for eight hours a day. The dam, 34 ft. high, will be the largest in the Huron River.

The lake will be from ½ to ¾ of a mile wide.

Eaton Bumper Opens Branch

CLEVELAND, Feb. 24—The Eaton Bumper & Spring Service Co. announces the opening of a warehouse branch and service station at Oak and 16th Sts., Kansas City, Mo. This will become the distribution point for Eaton bumpers and springs in the Kansas City territory, which includes Nebraska, Iowa, Missouri and Kansas. Charles D. Parr has been appointed manager of the branch.

This new Eaton branch is one of a chain which is being established in the principal distributing centers of the country.

Butt Bros. Builds

DUBUQUE, IA., Feb. 24—The Butt Bros. Wagon Works, manufacturer of automobile bodies, this week secured a permit for a \$9000 addition to its plant here.

Quarterly Earnings of Fisher Body High

Reported as \$10,035,853 as
Compared with \$2,957,547
Last Year

DETROIT, Feb. 24—The Fisher Body Corp., for the quarter ended Jan. 31, 1926, including returns of subsidiary companies, reports net earnings of \$10,035,853, after expenses and depreciation reserves, against \$2,957,547 in the corresponding period last year. After reserves for interest and taxes, the company reported net income of \$8,484,124, equal to \$3.53 a share earned on the 2,400,000 shares of \$25 par value common stock outstanding. In the same quarter last year, the company reported net income of \$2,307,187, equal to 89 cents a share on the common stock.

For the nine months ended Jan. 31, 1926, the company reported net earnings of \$25,887,407, as compared with \$9,056,171 in the same period in the last fiscal year. Net income for the nine months amounted to \$21,929,529, equal to \$9.05 a share earned on the common, against net income of \$7,181,556, equal to \$2.79 a share earned on the common in the corresponding period of the last fiscal year.

Olds Motor Works Output, 250 Daily

LANSING, Feb. 24—The Olds Motor Works is now in one of the most prosperous periods in its history, according to production figures released by company officials.

Retail sales for the first 10 days of February were approximately 70 per cent of the entire production for February, 1925. The daily output is around 250, 91 per cent of which are closed models.

Production for February will show a decided increase over January, and the scheduled production for March will exceed even that of this month. The special roadster which the company will shortly enter into production is expected to meet with instantaneous approval, company officials say.

Emerson-Brantingham Has New Readjustment Plan

ROCKFORD, ILL., Feb. 24—A capital readjustment of the Emerson-Brantingham Co., Inc., has been announced by executives of the farm machinery and tractor manufacturing concern, which is expected to end the corporation's post-war depression and place it in a position to realize heavily upon the anticipated re-habilitation of the farmer-buying field.

A new corporation, under the laws of Illinois, has been submitted to stockholders, retaining the present name, but

supported by 200,000 shares of Class A stock and 20,000 Class B stock, neither of par value. The "A" stock will have a preference of \$50 a share in any distribution of assets, and has a prior dividend right to \$3.50 a share before distribution on the "B" stock, with which it will share equally.

In 1925, the company returned a gross profit nearly double that of 1924 and cut its net losses for operation in half. Unprofitable heavy-line plants at Waynesboro, Pa., and Columbus, Ind., have been disposed of, and manufacture has been concentrated at the Rockford and Batavia plants.

Seiberling Earns \$6 a Share on Common

AKRON, Feb. 24—Net sales of the Seiberling Rubber Co. for 1925 were \$10,569,522, according to the annual report issued today. This compares with sales of \$7,351,137 in 1924, a gain of 40.37 per cent.

Net profit was \$1,244,697, equivalent to 11.78 per cent on volume of business, and \$6 a share on the 183,310 shares of common stock. Earnings in 1924 were \$1,013,022, or \$5 a share.

Current assets exceed current liabilities to the amount of \$2,347,757.21, or a ratio of more than three to one. In the last year all accumulated dividends on preferred stock, amounting to \$232,832.96, were paid, leaving a net amount added to surplus of \$1,012,135. Additions to plant equipment last year increased capacity by 50 per cent.

Studebaker Output 40% Over Last Year

SOUTH BEND, Feb. 24—The Studebaker Corp. of America is launched on what promises to be a very prosperous year, according to figures given out by President A. R. Erskine.

Mr. Erskine said:

Production for January and February this year will exceed the corresponding months of 1925 by 40 per cent. We have now 1000 more men on our payroll than at this time last year. This follows the splendid record made in 1925, when we gained 23 per cent, as compared with a gain of 18 per cent for the automobile industry as a whole.

Chicago has placed with us the largest order we have ever received from a dealer. It calls for delivery during January and February of 1270 cars, valued at \$1,806,000.

Brake Co. Incorporates

DAVENPORT, IA., Feb. 24—The state has issued charter of incorporation to the American Brake Co. of Davenport, Iowa, for organization of a \$500,000 company to manufacture automobile brakes, friction motor brakes and accessories.

Edgar C. Erickson is president of the new company; R. R. Blank, Davenport, secretary-treasurer, and Max Brown, director. The stock issued is \$400,000 preferred and \$100,000 common.

Financial Notes

Hayes Wheel Co.—This company reports net profit for 1925 of \$1,719,005, after charges and Federal taxes, equal, after preferred dividends, to \$8.02 a share earned on the 197,044 outstanding shares of no par common stock. This compares with \$715,264, or \$3.16 a share, in 1924.

President Hayes says in part:

"The company finished the year in excellent financial condition, with current assets of \$5,618,066, including \$2,503,972 cash, against \$1,011,479 of current liabilities—a ratio of 5.5 to 1. First mortgage bonds were reduced from \$960,500 to \$559,100, and entire amount was retired on Feb. 1. There were also retired 1984 shares of preferred, reducing the amount outstanding to \$1,639,800, which now constitutes the only obligation ranking ahead of the common stock."

Reynolds Spring Co.—A quarterly dividend of 1¼ per cent on the class A and class B preferred, payable April 1 to stock of record March 15, has been declared by this company.

A net loss of \$114,317 for the year ended Dec. 31, 1925, was reported by the company. This was after interest, depreciation and taxes, and compared with net income of \$469,585 or \$1.13 a share, after preferred dividends, earned on 387,958 outstanding shares of no par common stock in 1924.

Net profit for the fourth quarter of 1925 was \$3,754, which compared with net loss of \$89,946 in the preceding quarter, and a net profit of \$82,584 in the fourth quarter of 1924.

Federal Motor Truck Co.—Stockholders of this company, in annual meeting, did not provide for a stock dividend, but action to this end, by increasing present authorized capital, is expected to be taken at a special meeting, and listing the stock on the New York Stock Exchange is said to be under consideration. In 1925 net profits were \$1,234,799, or \$6.17 a share, against \$599,087, or \$2.99, in 1924, and gross sales were \$11,000,000, exceeding 1924 by \$3,661,000. Current assets Dec. 31 were \$6,225,796, and current liabilities, \$1,270,546. Factory branches now number 20 and 1926 output is expected to exceed 10,000.

Gabriel Snubber Mfg. Co.—Directors of this company have declared an extra dividend of 62½ cents a share and the regular quarterly dividend of 62½ cents, payable Apr. 1 to holders of record of Mar. 15. On Jan. 1, 1926, a similar extra distribution was made.

Fisk Rubber Co.—This company has reduced its capital by \$428,100 of first preferred shares acquired through the sinking fund. This leaves 189,374 first preferred, 9,959 second preferred, 150 management shares and 811,311 common.

Chandler-Cleveland Motors Corp.—There have been deposited to date 252,206 shares of Chandler Motor Car Co. stock out of 280,000 shares issued, and 265,115 shares of the Cleveland Automobile Co., of 280,000 shares issued, for merger plan of the two companies.

Air Reduction Co., Inc.—This company, for 1925, reports net income \$2,016,865, or \$10.02, on 201,123 capital shares, compared with \$1,635,222, or \$8.56 on 191,014 shares, in 1924.

Ford Adds to List of Articles Made

River Rouge Plant Turns Out Varied Products in Connection With Car Output

DETROIT, Feb. 24—Articles made by the Ford Motor Co. at its River Rouge plant in connection with the automobile output range from paper to steel. In 1925 it added to the list of its varied products and substantially increased others.

Production of binder board at the Rouge paper mills increased 150 per cent in the last 20 months. It is now being manufactured at the rate of 25 tons, or more than 130,000 sq. ft. a day. In April, 1924, the output was 10 tons, or about 53,000 sq. ft. daily. Other increases are tractor output which gained from 83,100 in 1924 to 104,168 in 1925; glass which increased 66 2/3 per cent over 1924, and paper, which gained 38 per cent over 1925 production.

Body Production Declines

Body production declined 1 1/2 per cent. This is attributed to the increased body production at Iron Mountain. No comparison is available for motors on which production was started late in 1924.

Following is the output for 1924 and 1925 of the various products. It will be seen that benzol and paper are among items showing increases.

	1925	1924
Tractors	104,168	83,010
Glass (rough) sq. ft.	10,577,261	6,350,000
Glass (finished) sq. ft.	9,522,649	5,715,000
Motor benzol, gal.	6,763,166	6,300,000
Ammonium sulphate, lbs.	18,833,806	19,100,000
Gas, cu. ft.	8,338,447,000	8,700,000,000
Paper, lbs.	4,628,700	3,355,000
Coke, tons	583,796	600,000
Coal tar, gal.	6,123,879	6,300,000
Crude light oil, gal.	2,104,855	.....
Cement, bbls.	222,063	.....
Pig iron, gross tons.	341,325	.....
Ford sinter gross tons	44,927	.....
Crushed slag, gross tons	243,758	.....
Jobbing Foundry 1925, lbs.	21,718,496	.....
Castings, iron	4,112,215	.....
Carbon, steel	934,612	.....
Aluminum	70,511	.....
Manganese steel	69,444	.....
Milchrome, steel	895	.....
Bronze	143	.....
White metal ....	.....	.....
Steel ingots (electric furnace)	14,748,742	.....

Vulcan Mfg. Co. Formed

DETROIT, Feb. 24—Organization of the Vulcan Mfg. Co. for the manufacture of axles and automobile parts has been completed. The company is an outgrowth of the Vulcan Axle Co. which was sold at a receiver's sale some time ago.

The organization of the Vulcan Mfg. Co. came about through the re-purchase of the various units from the parties

DODGE DELIVERIES SHOW 48% INCREASE

DETROIT, Feb. 24—Retail deliveries in the United States of Dodge Bros., Inc., for the week ended Feb. 20 totaled 4755, which is the best January or February week in the history of the company.

Retail deliveries for the first three weeks of February show a 40 per cent advance over the corresponding period last year.

A total of 28,268 retail deliveries for the first seven weeks of 1926 compares with 19,047 in the first seven weeks of 1925, a gain of 48 per cent.

which had purchased them at the receiver's sale.

Officers of the new company are: F. C. Gilbert, president; W. A. Roberts, secretary; I. Cohen, treasurer; O. P. Bernhart, vice-president; R. G. Beechler, engineer.

According to Mr. Gilbert, the company is now in production and shipping orders daily.

Air Transportation Lines Inaugurated

DETROIT, Feb. 24—The first commercial air transportation line under contract with the Post Office Department for the carrying of United States mail was inaugurated on Feb. 15. This air line, between Detroit and Chicago, and Cleveland and Detroit, operated by the Ford Motor Co., will soon be followed by eight other lines, for which contracts have already been awarded. In addition to these lines the Post Office Department has asked for bids on the establishment of additional lines between Cleveland and Pittsburgh, Chicago and Atlanta, Cheyenne and Pueblo.

The following commercial lines will be in operation shortly under contract with the Post Office Department:

Boston and New York, Colonial Air Transport, Inc.
Chicago and Dallas, National Air Transport, Inc.
Chicago and St. Louis, Robertson Aircraft Corp.
Salt Lake City and Los Angeles, Western Air Express, Inc.
Elko, Nev. and Pasco, Wash., Walter C. Varney Co.
Seattle and Los Angeles, Pacific Air Transport, Inc.
Chicago, St. Paul and Minneapolis, Charles Dickinson.
Atlanta, Ga. and Miami, Florida, Florida Airways Corp.

Company to Change Name

INDIANAPOLIS, Feb. 24—Effective March 1, the name of the Automotive Parts Co., manufacturer of Hy-Duty cooling fans for automobiles, trucks and tractors, will be changed to Schwitzer-Cummins Co. The change is in name only. and the officers remain unchanged.

G.M. Report Shows 1925 Biggest Year

Net Earnings \$116,016,277—
Sales Jump 13.10% Over Former Record

(Continued from page 386)

and equipment depreciation increased \$8,766,361 and net balance in these accounts was reduced \$10,438,523.

This latter figure reflects the transfer of the real estate, plant and equipment of the former truck division, amounting to \$4,714,285 net, after depreciation, to the Yellow Truck & Coach Mfg. Co.

Sales of cars and trucks overseas by the export organizations are shown in this table:

Year	Units	Value Wholesale
1922	21,872	\$19,875,015
1923	45,000	39,193,869
1924	64,845	50,929,322
1925	100,894	77,109,696
Total	232,611	\$187,107,902

Detail of G. M. investment in affiliated and miscellaneous companies shows that its control of Vauxhall Motors, Ltd., acquired last year, is represented by 300,000 shares, valued at \$2,575,290.90. G. M.'s total investment in affiliated and miscellaneous companies amounts to \$86,183,747.07. These concerns, besides Vauxhall, include Fisher Body Corp., G. M. Acceptance Corp., Yellow Truck & Coach Mfg. Co., Ethyl Gasoline Corp., G. M. Building Corp. and General Exchange Insurance Corp.

Hawaiian Student Wins Firestone Scholarship

WASHINGTON, Feb. 18—Award of the Harvey S. Firestone four-year university scholarship to John Texeira, 16-year-old Hawaiian student in the high school at Kauai, was announced here this week by the U. S. Highway Education Bureau. Young Texeira won over 200,000 high school students in the United States and its possessions by his 700-word essay on "Economics Resulting from Highway Improvements."

Addition to Pontiac Plant

PONTIAC, MICH., Feb. 24—Ground for an addition to the Pontiac plant of the Oakland Motor Car Co., costing approximately \$300,000, was broken last week. This is according to an announcement made by President and General Manager Glancy.

The new structure will provide room for the axle-housing plant and will be put up directly back of the administration building.

The plant will be for the exclusive manufacture of axle-housing for the Oakland and Oldsmobile, now made in the Chevrolet gear and axle plant, Detroit. It is believed the structure will be completed in about 60 days.

Men of the Industry and What They Are Doing

Big Response to Contest Idea Reported by Hadden

More than 200,000 suggestions have been received to date by the Velie Motors Corp. for a name for its new type of sedan, according to C. W. Hadden, general sales manager, said at the recent Fort Wayne automobile show.

The company offers one of the new cars as a prize to the person submitting the best name which must express an immediate mental picture of the beauty and style and practicability of the car.

Removal of the Velie plant from Marion, Ind., to Moline, Ill., where all manufacturing is to be concentrated, is being carried on rapidly. The plant at Marion was sold to the Marion Insulated Wire & Rubber Co.

Spafford to R. P. I.

W. F. Spafford, for more than five years claim adjuster and traveling representative of the B. F. Goodrich Co., Akron, has been appointed professor of economics and business administration at the Rensselaer Polytechnic Institute, Troy, N. Y., where he will assume his new duties in the fall of this year.

Mr. Spafford was formerly connected with the Goodyear Tire & Rubber Co., and is at present acting head of the department of economics at the University of Vermont.

Warner With Universal Product

A. A. Warner, who for the last seven years has been identified with the Stromberg Devices Co. as sales engineer, has accepted a position as engineering and sales representative of the Universal Product Co., Detroit.

Weller Elected Director

J. H. Weller has been elected to the board of directors of the Gray Mfg. Co. Mr. Weller has been factory manager of the company for the last four years, before which he was with Pope-Hartford, Packard and other companies.

CHRYSLER FORESEES PROSPEROUS 1926

The automotive industry and American business in general will experience a highly satisfactory year during 1926, Walter P. Chrysler, president of the Chrysler Corp., declared at a luncheon of Los Angeles bankers and business men tendered in his honor there recently.

"The automotive industry is one of the best economic barometers we have," said Mr. Chrysler. "It is even better than the steel industry because it is closer to the ultimate market. And the health of the automobile business in a community indicates very well the condition of business generally.

"The present year is going to be a year of keener-than-ever competition in the automobile industry. Never in the history of motor cars has a man been able to get so much for his dollar. But I look forward to a good year and so does the industry as a whole."

Dusevoir Field Engineer

R. H. Mulch, vice-president and general manager of the Flint Motor Co., announces the appointment of Julius Dusevoir as field engineer. Mr. Dusevoir was formerly associated with Mr. Mulch in the Star organization on the Pacific Coast and lately has been identified with the General Motors central office engineering department.

Desmond With Disston

John K. Desmond, formerly with Philadelphia district sales office of the Crucible Steel Co. of America, has been appointed Philadelphia district manager of steel sales for Henry Disston & Sons, Inc.

Central Steel Co.

Names New Officers

The Central Steel Co., Massillon, Ohio, announces the election of F. J. Griffiths as chairman of the board, to succeed the late R. E. Bebb. Other officers advanced include C. E. Stuart, president and treasurer; B. F. Fairless, vice-president and general manager; J. M. Schlendorf, vice-president in charge of sales, and C. C. Chase, Jr., secretary. G. H. Freeborn, who has been auditor of the company for a number of years, was elected a member of the board and was named assistant treasurer.

Yeldell to Pacific Coast

Walter H. Yeldell, secretary, sales manager and a member of the board of directors of the Gardner Motor Co., St. Louis, has established his permanent headquarters on the Pacific Coast. The move is the outgrowth of the demands of Gardner's western distributors for an accredited factory official to help take care of business on the coast.

Approximately 15 per cent of the annual Gardner output is absorbed by that section and indications are that the proportion will be increased. Yeldell, well-known to automobile men throughout the country, has completed 25 years of service with the Gardner organization.

MacGlashan Advertising Manager

L. C. MacGlashan has been appointed advertising manager of the Zenith-Detroit Corp., manufacturer of Zenith carburetors, to succeed L. R. Babcock, who resigned on account of ill health. Mr. MacGlashan for the last year has been New England representative of the Monroe Auto Equipment Co.

Sibley Now District Manager

R. P. Sibley has been appointed district sales manager for the Martin-Parry Corp. in Jacksonville, Fla. Mr. Sibley was formerly connected with the Portland branch of the company.

Moreland Co. Brings Out New 2-Ton Truck

BURBANK, CAL., Feb. 23—A new 2-ton capacity, fast delivery truck styled the "Road Runner," has been brought out by the Moreland Motor Truck Co. Among the features of the new job are high speed, light weight, economy and handling ease.

The engine is a 6-cylinder Continental with seven-bearing crankshaft fitted with a vibration dampener. Clutch and transmission are of Brown-Lipe make and the latter is connected to the full-floating, bevel gear Timken rear axle by a tubular propeller shaft supported at the center by a self-aligning ball bearing. Driving

thrust is taken by radius rods. Universal joints are of the Peters oil type and the springs are the new "full load" design made by the U. S. Spring Co. Both sets of brakes act internally on rear-wheel drums.

Wayne Co. Car Sales Up

DETROIT, Feb. 24—Retail sales of passenger cars in Wayne county, in which Detroit is located were approximately 73.2 per cent better in January than for January, 1925. Thirty-one makes of cars totaled 3212 last month as compared to 1855 for the same period a year ago.

Truck and Battery Men Plan Selling Campaign

NEW YORK, Feb. 28—Sponsored by the Society of Electrical Development, electrical truck and battery manufacturers met recently in New York and voted \$15,000 for a greater selling program to be directed by a committee consisting of C. A. Ward, president, Ward Motor Vehicle Co., Mt. Vernon, N. Y., chairman; G. A. Freeman, Walker Vehicle Co.; E. R. Whitney, president, Commercial Truck Co., Philadelphia; W. W. Jones, General Electric Co.; W. Van C. Brandt, the Electric Storage Battery Co.; R. Zindle, the Society for Electrical Development, secretary.

Paige-Detroit Net Is 53% Over 1924

Sale of Cars and Parts Totals
\$62,763,787 in 1925—No
Bank Indebtedness

DETROIT, Feb. 24—Net earnings of the Paige-Detroit Motor Car Co. for 1925 increased 53 per cent over 1924, according to the company's annual report which has just been mailed to stockholders.

Sale of cars and parts totaled \$62,763,787. The number of cars sold totaled 39,114, an increase of 4,574 or 13.2 per cent over 1924. Net earnings after provisions for depreciation, Federal income taxes, and all other charges, amounted to \$2,437,865.95 as against \$1,588,085.65 in 1924.

According to the report, the ratio of total assets to total liabilities at the close of the year was more than three to one. The company, it was shown, also had no bank indebtedness at that time, but had on hand cash, collection drafts and marketable securities amounting to \$2,465,407.

Cash Position Satisfactory

Harry M. Jewett, president, in his letter transmitting the annual report says:

"The company's cash position is very satisfactory, especially inasmuch as we retired during the year debenture notes amounting to \$1,500,000 of which \$500,000 (expiring June 1, 1926) were retired in advance of their maturity leaving \$1,000,000 outstanding December 31. Of this amount we are holding in the treasury debentures of a par value of \$429,000, so that the total of these securities in the hands of the public is \$571,000.

"Preferred dividends of \$153,014 and common dividends of \$905,357 were paid. The common stock dividend was increased from \$1.20 to \$1.80 per share basis during the year."

Charcoal Gasoline Meets with Success in Tests

PARIS, Feb. 10 (by mail)—Official results of the Franco-Belgian competition for trucks running on charcoal gasoline place Panhard-Levassor first and second in the 3½ to 5-ton pneumatic-tired class, with Renault third. In the 2½-ton class a Bovy truck, fitted with the Etia gas producer, secured first prize. In the 5-ton class, these trucks running on solid pneumatic tires, a Saurer, equipped with the Schulz & Loriot producer, obtained first position.

This competition involved one month on the road in Northern France and Belgium, followed by power and fuel consumption bench tests at the Automobile Club of France laboratory. There were 14 competitors, all of which completed the tests.

A feature of these tests was the discovery of the purity of the gas now ob-

WILLYS-OVERLAND EXPORTS UP 50%

TOLEDO, Feb. 24—January was the second best export month in the history of Willys-Overland, Inc. R. J. Archer, general manager of exports, announced recently. The outlook, according to Mr. Archer, is for even better months as the year progresses.

Willys-Overland, Inc., exports in 1925, Mr. Archer said, showed a 50 per cent gain over exports for 1924. The gain was general, with practically all countries showing an improvement over the preceding year. The outlook for better economic conditions throughout the world strengthens the belief of many, Mr. Archer said, that 1926 will surpass 1925.

Closed cars are showing a big increase in all countries, although the open models still continue the best seller. Sale of Willys-Knight cars also show big gains, the gains being due to the buying public being better acquainted with the Knight engine.

tained from charcoal. The Panhard-Levassor engines, with white-metalled steel sleeves, were found to have less carbon deposit than is normal with gasoline and a well-adjusted carburetor. After one month the deposit on the piston heads was so thin and soft that it could be wiped off with a rag.

The competition was encouraged by the French and Belgian War Departments, who look upon charcoal gas as a suitable substitute for gasoline for military trucks.

U. S. Exported Eighty Airplanes Last Year

WASHINGTON, Feb. 25—The United States exported 80 airplanes, seaplanes and other aircraft during 1925, representing an increase of 35 per cent over the 56 exported during the preceding year, it is announced by the Department of Commerce.

A slight decrease—attributable to the falling off in aircraft parts and engine equipment—occurred in the value of all aircraft products exported in the last year. Their value was \$783,659, or \$14,614 less than the value of combined aircraft products exported during 1924.

Ford Erects Plane Plant

DETROIT, Feb. 24—Early erection of a new airplane manufacturing plant and a hangar having a 15-plane capacity was announced today by the Ford Motor Co. The plant and hangar will replace the building of the all-metal airplane division, recently destroyed by fire. Until the structure is ready, the division will continue to be housed in one of the new buildings of the Dearborn laboratory group.

H. G. Weaver Gets 1925 Harvard Award

Winning Paper an Analysis of
the Automobile Market
by Counties

NEW YORK, Feb. 20—Henry G. Weaver, General Motors Corp., Detroit, has won the 1925 Harvard award for scientific research in advertising for an analysis of the automobile market. This analysis, conducted in the General Motors sales section, covered several years of basic research work and covers the history, present conditions and future possibilities of the automobile industry, not only from an advertising and selling viewpoint, but also from a broad economic standpoint.

The Harvard jury of award placed special stress on that portion of the Weaver report dealing with the development of basic purchasing-power index for each county in the United States, which was considered as being the most conspicuous research accomplishment coming under its attention, the purpose of which was to bring about economy and secure efficiency in advertising by producing information of general value in furthering the knowledge and science of marketing.

The various indices to purchasing power that have been in use in the past, such as value of production, income tax return data, magazine circulation, etc., have failed to express purchasing power in accurate and readily usable terms, whereas the new process developed by General Motors provides an estimate for each county expressed in terms of dollars available for buying.

Florida Car Shipment Embargo is Modified

WASHINGTON, Feb. 25—The embargo on carload shipments of automobiles and trucks to points in Florida continues, except on the Florida East Coast Line which has exempted them, it is announced here by the car service division of the American Railway Association. The announcement was made in connection with one stating that, due to the progressive improvement that had taken place in the last few months in the railroad transportation situation in Florida, it was possible substantially to modify the state-wide embargo that had been in effect.

"For the movement in car lot quantities of automobiles and trucks except on the Florida East Coast," the statement continues, "it will be necessary for the individual receiver located in Florida to file a statement as to his monthly requirements with the appropriate committees of the Florida division of the Southeast Shippers Regional Advisory Board, and permits will be issued by the carriers on a percentage basis, equally to everyone, and predicated upon the requirements of each receiver."

Buick March Output to Exceed 27,000

FLINT, MICH., Feb. 24—Work of increasing the capacity of the Buick factories to 1200 passenger cars daily has progressed so well that President H. H. Bassett is confident that the contemplated March production of 27,122 cars will be achieved.

As an additional step, a new building, which will be devoted to the manufacture of crankshafts, has been announced. This building will have a floor space of 108,000 sq. ft. The space formerly occupied by the crankshaft department in other buildings will be occupied by other departments.

Buick prospects for 1926, according to Mr. Bassett, promises to be even better than in 1925. The total gross business it is said will probably be in the neighborhood of \$300,000,000.

Total carloads of freight forwarded by the Buick Motor Car Co. in 1925 amounted to 86,422, according to George C. Conn, head of the traffic division. Of this number 56,839 were carloads outgoing, and 29,583 incoming. Drive-aways from the factory totaled 26,524.

Westinghouse Develops Gas-Electric Bus Drive

EAST PITTSBURGH, PA., Feb. 23—The Westinghouse Electric & Mfg. Co. has developed a gas-electric drive for motor coaches which it has been demonstrating in a Fageol coach with steel body, designed by Charles O. Birney and built by the American Car Co.

The new drive consists of an electric generator directly connected to the engine through a flexible coupling, and two motors mounted side by side near the middle of the chassis and connected through two shafts to a dual rear axle. The motors may also be arranged in tandem on one propeller shaft driving a conventional type of rear axle. An electric brake is a feature of the design.

Dirigold Corp. Buys Haynes Body Factory

KOKOMO, Feb. 24—The Haynes Automobile Co. body plant, which was built shortly before the concern became bankrupt, but which was never used, has been sold by the bondholders of the company to the Dirigold Corp., which has offices in Chicago and manufacturing plants in Sweden.

Installation of machinery and equipment in the plant here will start at once, officials of the Dirigold company state, and production will start in May.

Among the concern's products are motor boat propellers, said to have great resistance to corrosion.

Engineers Will Discuss Elimination of Waste

CHICAGO, Feb. 24—The Society of Industrial Engineers will hold its 13th National Convention in Philadelphia June 16-18, at the Bellevue-Stratford Hotel.

All papers and discussions will deal with practical methods for eliminating waste. The program is being arranged to cover all departments of a manufacturing business. All meetings will be open to the public.

1925 Car Fatalities Show Smaller Gain

WASHINGTON, Feb. 24—While the rate of increase of automobile fatalities is growing year by year, it declined greatly in 1924 and 1925, according to figures given out by the Department of Commerce, made public yesterday.

In 1924, the committee on statistics of the National Conference on Street and Highway Safety reports that there were 23,300 deaths due to such accidents in the United States, which was an increase of 700 over 1923, and the figures for 1925 indicate a further increase; yet the figures for 1924 show a percentage increase of 6.8 per cent, as compared with approximately 20 per cent for the 1923 figures over 1922. The 1925 figures, based on returns from 78 cities, indicate a further recession to about 2.5 per cent.

Cumulative Efforts Successful

The committee sums up the data on automobile fatalities as follows:

It thus appears that the rate of increase in automobile fatalities has been somewhat checked, although it is not yet possible to record an actual decrease. Taking a longer view of the situation, it may be asked whether traffic accidents are permanently on the increase, or whether the rate of increase shows a sufficient slackening to warrant the hope that a downward trend may soon be expected.

While it is early to draw definite conclusions, we point to the declining rate of increase in fatal accidents as an indication that the cumulative efforts of individuals and of organizations toward greater safety of traffic on our streets and highways are beginning to bear fruit.

Developments of the Week in Leading Motor Stocks

NEW YORK, Feb. 24—In the general market weakness that has been noted of late the motor shares have held up remarkably well. Some declines of minor extent have been registered, but these have been offset by gains in several of the most important stocks.

The speculative community has undoubtedly been rendered nervous by some of the developments in the trade and banking situation. The slackness of retail trade is regarded as seasonal, and it has not, apparently, affected automotive lines, which are selling at better than normal for the time of year. But there have been declines in wheat, stiffness in money rates, and a few isolated instances of reduced manufacturing operations.

While this sentiment has affected stocks in general, it is evident that the important interests that have been the largest buyers of automotive stocks still regard the outlook as unusually favorable, and it is their support that has kept quotations approximately at hitherto existing levels, except in the cases

where actual advances have been recorded.

Hudson has been one of the leaders in the automotive group, advancing several points on large transactions. The "market" believes that the directors of this company will soon feel that the time is ripe for increasing the dividend rate, which has been held down to \$3 yearly while the large profits of the corporation were being used to strengthen its general financial position and to provide for the additional plant facilities required for its expanding sales.

Jordan Notably Strong

Jordan has been notably strong, the advance being accompanied by the publication of figures showing the gratifying results of late 1925 and early 1926 operations.

General Motors has been comparatively inactive, now that the action of the board of directors in advancing the regular dividend rate is history. Publication of the annual statement for 1926

was without significance for Wall Street, as the principal items were already known.

The tire shares were rather weak, presumably because of the current reduced state of manufacturing operations, coupled with the decline in prices. But the fundamental position of the companies appears to be unchanged, and with the opening of the active motoring season they should be back again on full time production, and with profits on a level comparing favorably with last year's, allowing for the lower cost of crude.

Considering automotive shares as a group, they do not appear to be selling at high levels when compared with others of similar earning power and dividend payment. Notable examples of prices lower than would seem justified are Studebaker, which has been selling under 60, although paying \$5 a year plus extras; Stewart-Warner, quoted at around 85, although paying \$6, and earning in 1925 more than \$12 a share, and Stromberg at about 73, although paying \$6.

Stinson-Detroit Has Novel Features

2-Wheel Brakes and Electric Self-Starter Are Part of Plane's Equipment

DETROIT, Feb. 21—Embodying several new features destined to play an important part in commercial aviation, the third locally designed and financed airplane to reach the production stage, the Stinson-Detroit, was officially tested at Packard Field before 1,600 spectators here today.

Brakes on both wheels allow the plane to come to a stop in less than 100 ft. after touching ground. The necessity of having mechanics in attendance when the plane is started is eliminated by providing the 200 hp. air-cooled Wright engine with an electric starter. Using the brakes on the wheels to act as "chocks" and to assist in turning the plane, the pilot has complete control on the ground.

Pilot's Cabin Enclosed

All four passengers, including the pilot, are carried in an enclosed cabin provided with safety glass and heated from the exhaust of the engine, while the noise from the engine is minimized by carrying the exhaust way back below the cabin.

The varied experiences of Eddie Stinson, one of the oldest pilots in the country, was employed to advantage in developing the machine, which is a conventional design biplane, employing metal construction for the framework, with the fuselage and wings covered with fabric. The cruising speed is 100 m.p.h. with full load while at maximum throttle the speed is 125 m.p.h. Fuel for a six-hour flight can be carried. The plane weighs 2,850 lbs. complete.

Among the many prominent Detroiters carried on the official flights in the plane piloted by Eddie Stinson were William B. Mayo, of the Ford Motor Co., and his daughter. This plane, as well as the new Verville machine with the folding wings, was also at the field and both airplanes will be described in detail in these pages shortly.

French Makers Oppose Car Tax on Value Basis

PARIS, Feb. 10 (by mail)—French automobile manufacturers, in great majority, are opposed to the new schemes of taxation on a value basis, which will supplement the present horsepower taxes. Under this proposal, an annual tax varying from 1 to 8 per cent of the value will have to be paid on all passenger cars and trucks, with an increase of 10 per cent on this amount when passenger cars are habitually handled by a paid driver. From 1000 to 5000 francs, the rate will be 1 per cent; from 5000 to 10,000 francs, 2 per cent; increasing

DEFER RATE CHANGES ON LOCKS FOR YEAR

NEW YORK, Feb. 24—Agreement has been reached between the Underwriters Conference and the National Automobile Chamber of Commerce, which assures car makers that the various kinds of approved theft locks will be kept on the same rate basis during 1926. If coincidental locks ever have a lower rating than those of other approved types, it will be not earlier than Jan. 1, 1927.

Conferences on this subject were carried on by the N. A. C. C. insurance committee, of which William E. Metzger is chairman.

till above 100,000 francs, the maximum of 8 per cent will be applied.

Maximum taxes will be applied for the first two years of the car's existence. For the third and fourth years, there will be a reduction of 15 per cent; for the fifth year, the decrease will be 25 per cent; for the sixth year, 40 per cent; and beyond the sixth year, 50 per cent on the original tax.

The objections brought against this scheme are that it is much more complicated than the present horsepower tax, and will encourage tax-dodging. In France, in particular, where the currency is very unstable, it will be a difficult matter to determine the initial value of an automobile, and, in order to keep the tax low, there will be every inducement to purchase without accessories and fit cars afterwards.

Dreses Tool Co. Awards Contract for New Plant

CINCINNATI, Feb. 21—The Dreses Machine Tool Co. has awarded a contract for an entirely new plant to cost \$100,000. The Austin Co., Cleveland, is the engineer and builder.

The new plant will be of one-story design, 90x300 ft., with monitor. About 100 tons of structural steel will be required. Cranes will be installed, two 5-ton cranes in the center aisle and one 3-ton crane in the side aisle. The Austin Co. contract includes heating, lighting, plumbing and erection of cranes, in addition to construction.

Charles E. Gilbert is president and W. A. Hudson, secretary and treasurer of the Dreses Co. Mr. Gilbert is also interested in the Buckeye Foundry Co.

Rim Figures Changed

PHILADELPHIA, Feb. 24—Automotive Industries is advised by the Tire and Rim Association of America, Inc., that the figures on January rim inspection issued recently by the association and printed in last week's issue are incorrect. The revised figures sent by the association on the various sizes of rims show the total for the month as 1,980,481, instead of 2,026,088, as given formerly.

January Production 314,994 Cars, Trucks

Department of Commerce Issues Revised Figures—Total Under December

NEW YORK, Feb. 24—The total of 314,994 passenger cars and trucks produced in the United States and Canada in January, as reported by the Department of Commerce, was 4,575 less than the December output but 73,932 more than production in January, 1925. It compares also with 324,565 in January, 1924, and 249,371 in January, 1923. The National Automobile Chamber of Commerce estimate for January this year, based on shipping reports, was 333,727.

Detailed Figures

The department January figures show 282,483 passenger cars and 32,511 trucks, of which 271,231 cars and 29,601 trucks were made in the United States and 11,252 cars and 2,910 trucks in Canada. The total compares with 285,199 cars and 34,370 trucks in December and 212,921 cars and 28,141 trucks in January last year.

The department figures are based on returns from 179 manufacturers, 71 making passenger cars and 127 making trucks and 17 making both. Figures from 24 small firms, mostly truck makers, were not received in time for inclusion.

New German Commercial Airplane is Completed

BERLIN, Feb. 6 (by mail)—An eight-passenger commercial aeroplane, incorporating a number of unorthodox features, has been completed by the Udet Flugzeugbau of Munich. The plane is equipped with four Siemens-Halske air-cooled radial engines of 100 hp. each. These engines are mounted beneath the cantilever high-lift monoplane wing, two on each side of the fuselage, and drive-propeller propellers behind the trailing edge of the wing by means of shafts.

The cabin is unusually roomy being 12 ft. 8 in. long, 5 ft. 3 in. wide and 6 ft. 7 in. high. The fuselage is of all-duralumin construction and has an open cockpit accommodating two pilots and a navigator in the nose. Independent gasoline tanks for each engine are carried in the wooden wing which is built on two box spars, with duralumin struts and plywood ribs, the wing being covered with three-ply veneer. The span of the plane is 72 ft. 3 in.; it has a length of 50 ft. 10 in. and a height of 12 ft. 1 in. No data as to weight or performance are as yet available.

Timken Earns \$1.31 a Share

NEW YORK, Feb. 24—Timken-Detroit Axle Co. reports for 1925 net profit of \$1,382,065, or \$1.31 a common share compared with \$203,319 in 1924.

Anti-Knock Agents Tested by Roesch

Chicago Section of S. A. E.
Hears Results of Many and
Exhaustive Tests

CHICAGO, Feb. 24—The effects of various anti-knock agents as determined by many exhaustive tests were presented to the Chicago Section of the Society of Automotive Engineers tonight by Prof. Daniel Roesch of the Armour Institute of Technology.

In these tests the fuel mixture was the average one used by the average driver which is too rich for greatest economy. Tests were made at full load with varying spark advance and four points were noted where knocking was first detected, where it was readily heard, quite pronounced and very bad. These points were plotted vertically while horizontal distances represented spark advance.

To Increase Spark Advance

Results were then shown by means of curves indicating how the use of various percentages of benzol made possible the use of more spark advance. Other curves showed the effect of tetraethyl lead in making more spark advance possible, the permissible advance increasing rapidly with the quantity of lead used. Still other tests were given showing the effect of water injected into the intake manifold in increasing the allowable spark advance.

The conclusion reached by studying these curves is that tetraethyl lead is very effectual in stopping the knocking tendency, benzol is quite effective, and water is fair. In all of these tests, however, the power increase was slight, being but 2 or 3 per cent, the chief advantage being in smooth operation. In the matter of power, the use of water seemed to have no appreciable beneficial result, there also being the danger of rusting the cylinders and pistons in case the water is not shut off before the engine is stopped.

Another conclusion reached was that, with engines designed for higher com-

Coming Feature Issues of Chilton Class Journal Publications

March 1—Chilton Tractor &
Equipment Journal—Highway
Number.

May—Automobile Trade Jour-
nal—Biggest Market Issue.

May 6—Motor Age—Sales and
Service Reference Number.

pression, the use of "soothing syrups" might show an increase of about 25 per cent in gasoline mileage, while, with present-day cars, the effect was slight, being in the neighborhood of 2 or 3 per cent.

Tractor Exports Double in Value

WASHINGTON, Feb. 23—With one exception, exports of agricultural implements from the United States in 1925 were the largest for any previous year, reaching a total of \$77,936,911, according to figures just announced by the agricultural implement division of the U. S. Department of Commerce. In 1920, the exports were \$79,360,000.

Of the total exports \$27,866,800 were tractors, compared with \$14,678,000 tractor exports in 1924—approximately double the previous year exports.

Buys Battery Company

CHICAGO, Feb. 21—The Thompson-Neaylon Mfg. Co., Inc., manufacturer of automobile equipment, announces that it has purchased the entire capital stock of the Battery Products Co., Chicago, manufacturer of battery terminals, cables and posts. The sales of these products will be handled through the T-N sales organization, and eventually the business will be completely absorbed into the purchaser company. Manufacturing will be done in a new building to be erected next to the T-N factory.

Hardwood Outlook Bright for 1926

February Sales 10% Over Last
Year—Inquiries for First
Half Up 20%

ATLANTA, Feb. 23—Hardwood sales to the automobile and body industries in the North have noted an added impetus since Feb. 1 at this and other principal lumber markets of the southeast, manufacturers reporting an average increase of 10 to 12 per cent in their total sales volume in this field, as compared with the first half of February, 1925.

Heavy Demand Ahead

Inquiries for delivery during the second quarter of the year are approximately 20 per cent larger than at this time in 1925, while all indications promise the heaviest demand for the first half of the year in the history of the business. Prices are unchanged.

Principal woods in demand from the body manufacturers are white ash and maple in thicker dimensions, and some gum. Wheel manufacturers are buying actively of hickory. Production is still at a comparatively low ebb, but has been increasing in the last two weeks with favorable weather.

Course in Car Salesmanship

NEW YORK, Feb. 24—Alfred Reeves, general manager of the National Automobile Chamber of Commerce, will speak on the subject "Has the Automobile Reached its Zenith?" at the West Side Y. M. C. A. under the auspices of the School, on March 2. This will be the first of a series of addresses and open forum discussions on the subject of automobile selling, to be given by experienced sales managers and other automobile executives. The series in effect will be a practical night course for men interested in automobile salesmanship.

Harry Bragg, general manager of the Automobile Merchants Association of New York, Inc., is chairman of the committee in charge.

Calendar of Coming Events

SHOWS

Feb. 15-Mar. 15—International Automobile Show, Copenhagen, Denmark.

Apr. 3-14 — International Motor Car Show, Frankfurt-on-Main, Germany.

CONVENTIONS

Mar. 23-25—National Conference on Street and Highway Safety, Washington.

May 13-15—American Gear Manufacturers Association, Tenth Annual Convention, Book-Cadillac Hotel, Detroit.

June 8-10—Automobile Body Builders Association, Detroit, Hotel Statler.

June 14-19 — Automotive Equipment Association, Mount Royal Hotel, Montreal, Canada.

June 16-18—Thirteenth National Convention, Society of Industrial Engineers, Philadelphia, Bellevue-Stratford Hotel.

RACES

May 1 — Races at opening of new Speedway, Atlantic City.

May 30-31 — 500-mile race, Indianapolis.

June 12-13 — Rudge-Whitworth 24-hour stock car race, Le Mans, France.

S. A. E. MEETINGS

National

Mar. 25-26—Annual tractor meeting, in cooperation with American Society of Agricultural Engineers, Chicago.

June 1-4—Semi-annual meeting, French Lick Springs, Ind.